WP6: Consumer acceptance, preferences, and communication

Report on the outcome of the quantitative consumer survey (D.6.2)

Claudia Meier, Hanna Stolz, and Karlotta Koch

07.04.2021

Research Institute of Organic Agriculture FiBL | Ackerstrasse 113 | Postfach 219
5070 Frick | Switzerland | Phone +41 62 865 72 72 | info.suisse@fibl.org | www.fibl.org

EXECUTIVE SUMMARY

The demand for processed organic food is increasing. Whereas food processing is mainly used to increase food safety and the shelf-life of food, it may also have negative impacts on the quality, healthiness, naturalness, taste, and nutritional value of a food product as well as increase its environmental impact. Since consumers perceive organic food as healthier, tastier, more natural, and more environmentally friendly than conventional food, the question arises to what extent processing of organic food is acceptable to organic consumers and which methods are in line with the organic principles.

Besides, the European Council (EC) Regulation No. 834/2007 sets the criteria for the production and processing of organic food, whereas it provides imprecise guidelines for the processing of organic food and lacks concrete instructions. Despite strictly prohibiting the use of ionizing radiation (EC 2007), mandatory standards for organic food processing have not yet been established for the EU. Thus, there is a need for an assessment framework based on which processors can evaluate the suitability of a processing method for organic food.

One possibility which may align the processing of organic food with organic consumers' perceptions on organic food is the application of the concept of careful processing, although a clear definition of this concept and to what extent processing is perceived as careful by organic consumers is still missing. Moreover, for stakeholders in the organic value chain, it would be important to know how the added value of careful processing could be communicated to organic consumers.

This report provides an overview on the results of a consumer study which was carried out as part of the transnational project ProOrg. The project aims at developing a Code of Practice for processors of organic food and organic labelling organizations. This Code of Practice is supposed to guide operators in their choice for the most suitable processing methods for organic food. For this purpose an assessment framework shall be developed, taking into account organic consumers' perceptions and expectations towards (processed) organic food. Hence, the aim of the consumer study was to investigate organic consumers' acceptance of processing methods for organic food and if careful processing may be a – from the perspective of organic consumers – suitable concept for the development of the assessment framework.

Milk was chosen as sample product in this study. An online survey including a choice experiment was used to investigate organic consumers' acceptance and expectations of processing methods. Participants were recruited in Germany and German speaking Switzerland through the online panel of the market research firm respondi. In total, data was collected from 600 consumers in Germany and 687 consumers in Switzerland.

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

We found that processing plays a hidden role in the purchase of milk. However, it indirectly plays an important role in consumers' milk choice behaviour in that it affects the product attributes taste, freshness, and shelf-life, which are important to consumers. The more consumers buy organic food, the more they pay attention to processing and the less they place emphasis on shelf-life.

Consumers are sceptical towards new milk processing methods and prefer the method they know. Hence, raising consumers' awareness about impacts of processing on relevant product attributes is crucial (to help them shape their preferences). Still the results of the choice experiment and the quantitative survey suggest that HPP, although not so far applied for milk processing in Germany and Switzerland, has a high acceptance among (organic) consumers. The methods'advantage is its'ability to preserve the taste and vitamin content. Accordingly, it is a promising method in organic processing. In contrast, micro filtrated & pasteurised milk is less preferred by organic consumers and thus less recommended.

The evaluation of the concept of careful processing showed that consumers considered careful processing to be very important and stated to be willing to pay more for carefully processed food. They considered it very important that a processing method is communicated on a product's packaging and that the packaging is as environmentally friendly as possible. The consumers' focus was on the maintenance of taste, vitamins and (micro-) nutrients, whereas the maintenance of vitamins and (micro-) nutrients are more relevant for organic consumers than for non-organic consumers. The evaluation, furthermore, showed that consumers have a very low acceptance of modification/loss/impact through processing. Most of them accepted no or only minimal impacts on nutrients, taste, and naturalness. With respect to environmental impacts they were somewhat more tolerant. To conclude, consumers' expectations towards carefully processed food seem far too high and can hardly be fulfilled by any no matter how careful processing method.

Respondents perceived high pressure processing (HPP), pasteurization, cold extrusion, micro filtration, and homogenization as most careful and were also perceived as more suitable for the processing of organic food. Ultra-high temperature treatment (UHT), hot extrusion, and pulsed electric fields were perceived as least careful. The evaluation of processing methods with respect to "carefulness" seemed to be easier the more respondents knew about the processing method. However, methods generally scored higher with respect to the suitability for organic processing than with respect to careful processing. Thus, cold and hot extrusion were considered as significantly more suitable for the processing of organic food than they were considered as careful. Hence, respondents seem to be somewhat more tolerant when it comes to organic than when it comes to careful processing. Both importance and willingness to pay for carefully processed products was found to increase with increasing organic purchase frequency.

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

The survey showed that the concepts of careful processing and organic processing seem to match very well. For both concepts "the maintenance of nutrients", "the maintenance of naturalness" and "no/ low product stress" are important components/ aspects. Careful processing offers organic producers and processors the possibility to further differentiate their food products in the market. Still, in communication with consumers, the expression «carefully processed» might give rise to overly high expectations. Accordingly, communication should rather focus on for consumers' tangible benefits like the preservation of a food's natural taste and nutritional content.

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table of Contents

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

List of Abbreviations

Table 1: List of abbreviations

CH	Switzerland
DE	Germany
EU	European Union
FTNS	Food technology neophobia scale
HPP	High pressure processing
MF	Micro pasteurisation
n	Number of respondents
PAST	Pasteurized
PEF	Pulsed electric fields
SD	Standard deviation
UHT	Ultra-high temperature

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

List of Tables

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

List of Figures

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

1. Introduction

Organic consumers in Germany and Switzerland resort most often to unprocessed organic food (Stolz 2019; BLE 2020; Bio Suisse 2020). However, the demand for processed organic food is increasing. In fact, processed organic food products such as organic milk, cheese, and other organic dairy products, but also organic convenience products, such as frozen foods and sweets, registered growing sales in 2018 in Germany and Switzerland (Schaack 2019; Bio Suisse n.d.). Whereas processing is mainly used to increase food safety and the shelf life of food, it may also have negative consequences for the quality, healthiness, naturalness, taste, and nutritional value of a food product as well as increase its environmental impact. For example, ultra-processed foods increase the risks of illnesses, social diseases of our century, and mortality in humans (Moubarac et al. 2013; Juul and Hemmingsson 2015; Rauber et al. 2015; Kim et al. 2019; Schnabel et al. 2019). Consumers buy organic food as they perceive it as healthier, tastier, more natural, and more environmentally friendly than conventional food (e.g. Hamzaoui Essoussi and Zahaf 2009; Kahl et al. 2012; Lee et al. 2013; Stolz et al. 2009; von Meyer-Höfer et al. 2015). Therefore, the question arises to what extent processing of organic food is acceptable to consumers of organic food.

One possibility which may align the processing of organic food with organic consumers' perceptions on organic food is the application of the concept of careful processing (Kahl et al. 2014). In fact, the use of careful processing methods may be an opportunity for producers of organic food to improve the market positioning of their products. According to Kahl et al. (2014), careful processing refers to the cautious handling of raw materials during processing to sustain their intactness and protect all vital substances of a food product. However, a clear definition of the concept of careful food processing is still missing (Nielsen T. 2004) and the conccept has therefore not been operationalized in the area of organic food processing so far (Beck et al. 2006). Again the question arises to what extent processing is perceived as careful by organic consumers and under which circumstances a product can be considered as „carefully processed". Moreover, for stakeholders in the organic value chain it would be important to know how the added value of careful processing could be communicated to organic consumers.

So far, processors of organic food and organic labelling organizations have been left on their own to define which processing methods they consider in line with the standards of organic production and organic consumers expectations towards organic food. The European Council (EC) Regulation No. 834/2007 sets the criteria for both, the production of organic food and organic food processing. However, the regulation provides imprecise guidelines for the processing of organic food and lacks concrete instructions. Despite strictly prohibiting the use of ionizing radiation (EC 2007), mandatory standards for the processing of organic food have not yet been established for the EU. Thus, there

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

is a need for an assessment framework based on which processors can evaluate the suitability of a processing method for organic food. As the success of a food product depends on consumers' acceptance, such a framework should build on organic consumers' expectations towards organic food processing. As mentioned above, one possibility may be to develop a framework based on the concept of careful processing. However, so far there has been only little research on the suitability of processing methods for organic food from the point of view of organic consumers.

This report provides an overview on the results of a consumer study which was carried out as part of the transnational project ProOrg. The project aims at developing a Code of Practice for processors of organic food and organic labelling organizations. This Code of Practice is supposed to guide operators in their choice for the most suitable processing methods for organic food. For this purpose an assessment framework shall be developed, taking into account organic consumers' perceptions and expectations towards (processed) organic food. Hence, the aim of the consumer study was to investigate organic consumers' acceptance of processing methods for organic food and if careful processing may be a – from the perspective of organic consumers – suitable concept for the development of the assessment framework.

Milk was chosen as sample product in this study since organic milk is among the most popular products on the organic market in Switzerland (Richter et al. 2004) and Germany (Schaack 2020). In addition, milk is a processed product consisting of only one initial product. Thus, it is a processed product with relatively low complexity, which was an important precondition for studying the effect of processing methods on consumers' preferences.

An online survey including a choice experiment was used to investigate organic consumers' acceptance and expectations of processing methods. Participants were recruited in Germany and German speaking Switzerland through the online panel of the market research firm respondi. In total, data was collected from 600 consumers in Germany and 687 consumers in Switzerland.

This report is structured as follows: First, the state of the art, on the basis of which the consumer study was carried out, is presented. This includes a description of the processing methods currently used for organic food and a review of the literature on the driving factors of organic food choice behaviour and organic consumers' expectations towards organic and/or careful food processing, including novel processing methods (chapter 2). As a next step, the objectives and research questions of the consumer study are listed (chapter 3). Then, the methods applied in the consumer study are presented, including a description of the online questionnaire, the data collection process, the country samples, and the methods used for statistical analysis (chapter 3). Subsequently,

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

the results of the consumer study are reported in order of the research questions (chapter 4). The report ends with a summary of the results conclusion (chapter 6).

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

2. State-of-the-art

2.1 Food processing

Food processing is described as

"any of a variety of operations by which raw foodstuffs are made suitable for consumption, cooking, or storage. […] Food processing generally includes the basic preparation of foods, the alteration of a food product into another form […], and preservation and packaging techniques" (The editors of encyclopaedia britannica 2015).

Examples of food processing, be it for food preservation or transformation, include thermal treatments, refrigeration, dehydration, adjustments in the pH of a food, smoke, reducing or eliminating the concentration of oxygen in the atmosphere or gas that is in direct contact with the food product, chemical additives, and radiation. Other innovative technologies for food preservation have been developed in the last 20 years, for example ultra-high pressure also named high pressure processing (HPP), microwave or ohmic heating, and pulsed electric fields (PEF) (Heldman 2011).

The primary focus of food processing is food safety. Food is processed to reduce the number of food-borne illnesses in humans by eliminating pathogenic microorganisms, natural toxins, and enzymes (Van Boekel et al. 2010; Heldman 2011). Further benefits that result from food processing are shelf life extension, higher nutritional value in terms of improved digestibility and nutrient bioavailability, and increased sensory quality, referring to better taste, texture, and flavor. Moreover, food processing offers the creation of new food products including functional foods and convenience food such as ready-to-eat and semi-prepared food products (Van Boekel et al. 2010). It furthermore increases the seasonal and global availability of different food products (Van Boekel et al. 2010).

However, food processing may also cause undesired effects. Chemical reactions may lead to losses in nutrients, for instance the reduction of heat-sensitive Vitamin A and D through thermal treatments. Furthermore, food processing may create unwanted compounds such as acrylamide or heterocyclic amines. Food processing may also lead to the formation of compounds that negatively affect the flavor of a food product or cause discoloration and loss of texture (Van Boekel et al. 2010).

2.1.1 Regulation of organic food processing

Currently, the processing of organic food is regulated by the EC Regulation No. 834/2007. Most articles concerning processing refer to ingredients, substances, food additives, and the production of organic yeast. While organic standards prohibit the use of many preservatives and food additives, the regulation is not specific concerning the use of

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

processing technologies or methods. According to Article 6c and 6d of the European Council Regulation on Organic Agriculture, 'substances and processing methods that might be misleading regarding the true nature of the product' (EC 2007: 7) are prohibited and food must be processed with care. Biological, mechanical, and physical methods are considered appropriate. Additionally, Article 10 prohibits the use of ionizing radiation for the processing of organic produce (EC 2007). According to Article 19.3 food processing must not change the true nature of the food product and must not restore properties that have been lost during processing and storage (EC 2007). Besides the prohibition of certain technologies for oenological practices, the new regulation EU 848/2018 does not add new requirements to the processing of organic food (EU 2018). Further regulations concerning the use, intensity, duration, and appropriateness of specific food processing technologies have not yet been established on the EU level. Both regulations are vague and leave room for interpretation. For example, the degree of carefulness or how carefulness is measured are not defined.

Organic food processing is often related to the concept of careful food processing (Kahl et al. 2014). The principle of care is essential to organic food production in general (IFOAM n.d.) and considered important for organic food processing (KRETZSCHMAR And SCHMID 2011). Careful processing is considered as one of the main aspects that determine market success of organic food (KAHL Et al. 2012). Still, careful food processing is not considered to be a synonym for organic food processing (Kahl et al. 2014). According to Kahl et al. (2014), "careful processing refers to care taken with raw materials used during the act of processing, in such a way that they maintain their integrity as far as possible, that all vital substances (all known nutrients) are protected and maintained where they are deemed beneficial to human health, and/or enhanced by the process, improved upon." (2585). Furthermore, careful food processing is often linked to another concept, the concept of minimal food processing. This concept relates to the use of processing methods that change the nutritional and sensory value of food as little as possible (Nielsen T. 2004).

Due to missing and unspecific regulations for orgnaic food processing, the organic market has adopted conventional processing technologies to a considerable extent. This has different consequences. On the one hand, some processing methods or processed products might violate the principles of organic agriculture (EC 2007, IFOAM n.d.). For example, ultra-high temperature (UHT) processing of milk might violate the organic principle of care since it highly affects the quality of milk (Kahl et al. 2014). On the other hand, since many food processing technologies are allowed for organic food, a wide range of processed products and even ready-made food and convenience food are available in organic quality.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

However, associations for the certification of organic food have come up with their own standards and regulations. For instance, the standards of Demeter, which is an international organic food association, are stricter than the EU organic standards and are more explicit in terms of organic food processing. The Demeter association requires food to be processed as carefully as possible. Concerning the processing of milk, for example, Demeter permits only pasteurization. Hence, homogenization, sterilization, and UHT treatment of milk, as well as the use of extended shelf life technologies are prohibited. While cold extrusion is allowed, hot extrusion is restricted. Besides, Demeter prohibits for example gassing of food, chemical conservation of food, the use of microwaves, and high frequency infrared ovens. Furthermore, iyophilization, also called freeze-drying, is only allowed for milk, fruits, and vegetables (Demeter E.V. 2020).

While Demeter is among the most popular organic brands in Germany (PöpseL et al. 2018), it is less famous in Switzerland (Stolz 2019). In Switzerland, the Bio Suisse Knospe label is the most popular label (Stolz 2019). The label permits only careful, mechanical, or physical food processing. Chemical food processing is prohibited. Concerning the processing of milk, Bio Suisse Knospe allows pasteurization, and, under certain conditions, homogenization, standardization, micro filtration, and UHT processing. High pasteurization and sterilization of milk are restricted. Extrusion is only allowed when performed carefully. Furthermore, HPP is not allowed for meat processing and not further mentioned in the regulations of Bio Suisse Knospe (Bio Suisse 2020). To the best of our knowledge, Demeter and Bio Suisse Knospe have not published any other statements on the use of HPP and PEF for food processing yet.

To summarise, on EU level, the processing of organic food is weakly regulated. Consequently, producers and processors of organic food as well as labelling organizations are left alone in their assessment whether processing technologies are suitable and in line with organic principles. Thus, the project ProOrg aims to develop a Code of Practice for the processing of organic food. This Code of Practice shall be based on the knowledge of scientific experts, processors, labelling organization, other relevant stakeholders, and consumers (Part B of full proposal 2018). This report provides knowledge on the consumers' view on organic food processing.

2.2 Driving factors of organic food choice behaviour

In previous research, consumer perceptions and expectations of organic food have been studied extensively. The main reasons for consumers to buy organic food are health, taste, environmental protection, and animal well-being (e.g. Zanoli and Naspetti 2002; Honkanen et al. 2006; Stobbelaar et al. 2007; Hamzaoui Essoussi and Zahaf 2009; Kahl et al. 2012).

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

First and foremost, many consumers purchase organic produce because they perceive it to be healthier (Zanoli and Naspetti 2002; Wang and Sun 2003; Padel and Foster 2005; Sheperd et al. 2005; Hamzaoui Essoussi And Zahaf 2009; Kahl et al. 2012; Schöberl 2012), better cor their personal well-being (Zanoli and Naspetti 2002; Kahl et al. 2012), and safer (Richter et al. 2004; Padel and Foster 2005; Jensen et al. 2013; Bryła 2016; Grzybowska-Brzezinska et al. 2017; Hasimu et al. 2017) than conventional produce. Thus, people consider the consumption of organic products as an investment in personal health (Kriwy And Mecking 2012). The believe of consumers in the advantage of organic products over conventional products in terms of health is based on the reduction or renouncement of chemical substances as well as food additives and morbid substances in the production and processing of organic food, respectively (Cooper et al. 2007; Hughner et al. 2007; Naspetti and Zanoli 2009; Bruschi et al. 2015), but also in the perception that organic products contain more nutrients than their conventional counterparts (Hill And Lynchehaun 2002; Lea and Worsley 2005; Cooper et al. 2007; Lee et al. 2013). Scholars also call this phenomenon the health halo effect, that is, the positive perception of a food's characteristic, here the organic claim, is transferred to another characteristic of the same item, here its nutritional value, thereby increasing its attractiveness to the consumer (LEE et al. 2013). Recent studies have shown that organic produce may contain more health relevant nutrients than conventionally produced food (Baranski et al.,2014), and in addition, processing can have a considerable influence on the nutritional quality of food (HENRY and HEPPELL 2002; IGUAL et al. 2010).

Second, organic food is often believed to taste better than conventional food (Mceachern and Mcclean 2002; Fotopoulos et al. 2003; Wang and Sun 2003; Stobbelaar et al. 2007; Lee et al. 2013), leading to a positive label effect in sensory evaluation studies (Hemmerling et al. 2013). That is, once the label is omitted (blind tastings), participants do not prefer organic to conventional products anymore (Fillion and Arazi 2002). Scholars therefore call this pheonomenon the taste halo effect (Hemmerling et al. 2013).

Third, organic food is perceived as more environmentally friendly than conventional food and people assume it to support small-scale agriculture and local rural communities (Wang and Sun 2003; Hamzaoui Essoussi and Zahaf 2009). In the context of pressing social norms and environmental concern, people feel a moral obligation to contribute, which leads to a growing acceptance of organic and environmentally friendly produced food (Rana and Paul 2017).

Fourth, People who are concerned about animal welfare are more likely to consume organic food (Honkanen et al. 2006). Animal wellbeing is especially important for consumers of organic food in Germany and Switzerland (Stolz 2019; Ble 2020).

The production costs per unit of organic produce are generally higher than per unit of conventional produce. This results in a price difference in the supermarket. For many

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

people, high price and low availability are central factors that prevent them from purchasing organic food (O'donovan and Mccarthy 2002; Buder et al. 2014; Rödiger and Hamm 2015; Rana and Paul 2017). Reasons for this might be a low disposable income or lack of knowledge about benefits of organic food (Lee et al. 2013; Wiedmann et al. 2014; Sörqvist et al. 2015; Zepeda and Deal 2009). The influence of budget constraints becomes apparent when comparing consumer preferences across different countries. For instance, Swiss consumers have been found to be less price sensitive than German consumers (Deutschland 2011 – Handel, Verbraucher, Werbung 2011). Thus, for Swiss consumers the quality and taste of a product seems to be more important than the price (Infanger 2012). Another aspect which might hinder the purchase of organic food is the limited availability of certain food products in organic quality. Only a minor part of people is willing to make special trips to a different supermarket or store to purchase organic food. However, a substantial number of people would be willing to buy organic food if it was available in the supermarket where they regularly shop (O'Donovan and McCarthy 2002).

Furthermore, sociodemographic characteristics play a role in predicting organic food purchase behavior as they influence consumer attitudes and beliefs (Zepeda and Deal 2009; Lea and Worsley 2005). However, findings on the impact of sociodemographic characteristics as well as consumers' attitudes vary, which may be attributable to the attitude-behavior gap (Boulstridge and Carrigan 2000; Moraes et al. 2012).

Findings on the effect of age on organic food purchase behavior are not always consistent and vary between countries. In Germany and Switzerland, the frequency of organic food purchase increases with increasing age (Stolz 2019; BLE 2020). In other countries, older consumers were found to be less likely to buy organic food products (Magnusson et al. 2001; Loureiro and Hine 2002; Rimal et al. 2005; Dumortier et al. 2017) and the likelihood of paying a premium for organic produce decreased with increasing age (Govindasamy and Italia 1999). Other research claims that age only plays a minor or no role at all in predicting organic food purchase behavior (Fotopoulus and Krystallis 2002; Lea and Worsley 2005).

For the effect of education, findings also vary. In Germany and Switzerland, the frequency of organic food purchase has been found to increase with increasing level of education (Cordts et al. 2010; Stolz 2019; BLE 2020). However, several studies contradict these findings. For instance, Aertsens et al. (2009) report conflicting findings and Buder et al. (2010) found no significant effect of education on the purchase of organic food.

For the effect of gender, findings are more consistent. Thus, several studies found that gender influences organic food purchase behavior. Specifically, women are more likely to buy organic food products than men (Van Loo et al. 2011; Vecchio et al. 2016; Petrescu et al. 2017; Stolz 2019; BLE 2020) and also express a higher willingness to pay for organic

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

food (Govindasamy and Italia 1999; Van Loo et al. 2011). Reasons for this might be that women care more about health and healthy food (Moerbeek and Casimir 2005) and in many households, women hold the biggest responsibility for food shopping (Aertsens et al. 2009).

Also for the effect of income, findings are more consistent. For Switzerland and Germany, income has been found to have a positive effect on organic purchase behavior (Cordts et al. 2010; Stolz 2019). Also for other countries households with a higher disposable income were found to purchase more organic food (Loureiro et al. 2001; O'Donovan and McCarthy 2002; Sandalidou et al. 2002) and to be more likely to pay a premium for organic food (Govindasamy and Italia 1999).

Having children also seems to have a significant effect on the purchase of organic food. In fact, families with children were found to be more likely to purchase organic food (Freyer and Haberkorn 2008; Yue et al. 2008) because they want their children to stay in good health (Aertsens et al. 2009). Furthermore, health issues of children or family members seem to increase the purchase of organic products (Aertsens et al. 2009).

Hence, health and taste are important drivers of organic food purchase. Particularly for women, health seems to be an important motivating factor. Furthermore, price is an important hindering factor. For households with a low income price seems to decrease the likelihood of organic food purchase.

2.3 Organic consumers expectations towards organic food processing

In general, consumers lack knowledge about food processing and possible beneficial consequences of processing for food safety and nutrition (Beck et al. 2006; Batte et al. 2007; Eufic 2016). In addition, consumers, both organic and conventional, were found to have no knowledge about the differences between the processing of organic and conventional food products (Richter et al. 2004).

In spite of this lack in knowledge, processing seems to play a role in consumers food purchase behaviour and expectations towards food processing seem to differ for organic and conventional food. For instance, Arvola and Lähteenmäki (2003) distinguished two different types of organic consumers in terms of processing: on the one hand, traditional organic consumers who reject a high level of processing and focus on purity and naturalness of the product, and on the other hand, more modern organic consumers who have a positive attitude towards processed organic food and seem to appreciate the availability of organic convenience food. Williams and Hammitt (2001) found a correlation between a positive attitude towards organic food and the belief that food technologies make food too unnatural and artificial. In more recent research, it seems

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

that organic consumers prefer traditional food processing technologies (Hemmerling et al. 2016, Asioli et al. 2019). In fact, Hemmerling et al. (2016) found a strong correlation between organic purchase behavior and the preference for traditional processing methods in both Germany and Switzerland. Furthermore, a high level of processing was considered inconsistent with the idea of organic food (Arvola et al. 2008). Likewise, in Asioli et al. (2019), consumers preferring traditional food processing technologies were found to be more interested in organic and natural produce and food free of genetic modifications. They suggest that organic consumers respond more to health, environmental, and ecological issues than non-organic consumers, not only regarding organic food production but also concerning the processing of food.

However, studies on organic consumers' expectations towards organic food processing and particularly on organic consumers' acceptance of differently processed organic food products are still scarce (Prada et al. 2017). One study compared organic consumers' preferences towards fresh organic apples and ready-made organic pizza. According to this study, organic consumers resorted more often to the fresh unprocessed product than to the convenience product (Dean et al. 2008). Still, it might be difficult to interpret these findings since, in general, fresh apples may be considered more representative for organic food than ready-made pizza (Prada et al. 2017). Another study looked at Swiss organic consumers preferences towards differently processed organic milk (Richter et al. 2004). According to this study, processing was a very important influencing factor in consumers' milk choice behaviour, independently of their organic purchase frequency. Furthermore, pasteurization scored much higher in the categories "good", "fits good with organic", "natural", "careful", "has a better taste", and "fresh" than UHT and high-pasteurized milk. In fact, more than one fifth of the respondents considered UHT processing as not suitable for organic milk, and 15% of consumers considered UHT milk as of "worse taste" than pasteurized or high-pasteurized milk.

Since studies on the attitudes of organic consumers towards processed organic food are still scarce, information was also collected from studies that focused on general consumer expectations towards processed organic food or processed food in general. For example, researchers found that consumers attributed a lower positive value to organic food when the level of processing was higher (Roininen et al. 2006). In addition, in general, consumers' perceptions of the healthiness or naturalness of a food product decrease with increasing level of processing (Evans et al. 2010; Szocs and Lefebvre 2016). However, consumers were found to believe that processed organic food products were still healthier and tastier than their conventional counterparts (Eufic 2016; Prada et al. 2017). Additionally, consumers showed to be concerned that processed food had lost nutrients and was altered in taste and quality (Eufic 2016).

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Hence, organic consumers seem to expect organic food to be less processed and more natural than conventional food. Furthermore, consumers seem to prefer traditional methods for the processing of organic food. However, there is some heterogeneity in organic consumers preferences towards organic food processing, which is also shown by the increasing demand for processed organic food, including ready to eat food or products with longer shelf life (Kretzschmar and Schmid 2011, Schaack 2019; Bio Suisse n.d). Sheperd et al. (2005) suggest that organic consumers might accept certain processing methods as they increase the availability of ready-to-eat food like milk, bread, or pizza in organic quality. Furthermore, preferences for low levels of processing have not only been found for organic food but also food more generally, as consumers do seem to see a negative relationship between the level of processing and healthiness, taste, or naturalness.

2.4 Organic consumers expectations towards novel food processing methods

Little research has been done so far on organic consumers' preferences towards the use of novel processing technologies. Thus, this chapter does not only refer to organic consumers' preferences, but also to consumers' preferences in general. Asioli et al. (2019) and Cavaliere and Ventura (2018) suggest that organic consumers might perceive new food processing technologies as "unnatural" and might therefore be critical towards new food technologies, because they lack perceived naturalness and familiarity. Additionally, consumers with stronger ethical concerns about the environment are more likely to reject new processing technologies (Asioli et al. 2019). It is assumed that these consumers might consider new processing technologies as riskier, even if they are superior to traditional technologies in terms of sustainability, just because they are new and unfamiliar (Siegrist 2008; Cavaliere and Ventura 2018). For instance, technologies that increase shelf life are generally considered as important technologies to increase the sustainability of food due to their food waste reduction potential (Cavaliere and Ventura 2018).

In general, new food technologies create concerns in consumers because consumers lack knowledge about the technologies and their effects on the products (Cardello et al. 2007; Mújica-Paz et al. 2011). The less familiar respondents were with a new technology, the less likely they seemed to accept new technologies (Cavaliere and Ventura 2018). In contrast, people with an elevated level of food knowledge were found to be more likely to accept new technologies and less neophobic towards new technologies (Cavaliere and Ventura 2018). Thus, information about the processing technology, for instance with details on safety and benefits, may increase the acceptance of new food technologies (Cardello 2003). This is particularly important in the context of organic or careful food

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

processing, as new food processing technologies may be superior to traditional ones in terms of sustainability.

According to Deliza and Ares (2018), benefits in terms of health, sensory quality, and environmental friendliness positively impact consumer attitudes towards novel food technologies. Negative reactions may be caused by increased prices, dangers associated to the processing technology, negative impacts on health, the environment, and food quality. However, since consumers often have limited or no knowledge about new processing technologies, their attitudes towards technology, innovation, naturalness, food companies, governments, and science also play a key role (Nielsen et al. 2009; Deliza and Ares 2018). In a study by Deliza et al. (2003), consumers were found to perceive a food product of higher quality if the packaging contained information about the processing technology. Furthermore, favorable nutritional information and better taste resulted in positive attitudes towards novel processing technologies (Kozup et al. 2003; Cardello et al. 2007) whereas unfavorable nutrition information resulted in a negative effect (Kozup et al. 2003). In a study on Norwegian, Romanian, and Turkish consumers, young Norwegian consumers with a positive attitude towards new food technologies showed the highest acceptance for microwave dried fruits, a new food technology. In contrast, consumers with the highest acceptance of the traditional processing technology of air-drying were older or expressed positive attitudes towards organic, natural, and ecological behavior (Asioli et al. 2019).

Several studies specifically looked at consumer preferences with respect to high pressure processing (HPP) (e.g. Butz et al. 2003; Nielsen et al. 2009; Olsen et al. 2011; Martins et al. 2019), a new, supposedly more sustainable food processing technology that applies pressure to eliminate germs and prolong the shelf life of food (Deliza et al. 2005). In Europe, the method is used to process for example fruit juices, while in Mexico and Australia milk is already processed with high pressure. Current evidence suggests that consumer acceptance of HPP depends on a range of different factors: First, consumer perception of HPP may vary depending on the product. As HPP is quite costly, it seems to be more suitable for high value products. For instance, a higher price was considered positively for HPP baby food but negatively for HPP fruit juice (Nielsen et al. 2009). Likewise, Olsen et al. (2011) found that consumers are more likely to accept HPP apple juice if sold at the standard market price. Furthermore, longer shelf life due to HPP was considered a benefit for baby food but not for fruit juice. This can be explained by consumers preferring juices to be fresh, while a long shelf life indicates a higher degree of processing. In contrast, baby food is usually mainly available in processed forms, thus, consumers are accustomed to a long shelf life (Nielsen et al. 2009).

Second, there seems to be a difference in the acceptance of HPP between different countries. In a study of fruit juice in Brazil, HPP was perceived rather negatively

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

compared to the other processing methods freshly squeezed, pasteurized, non pressurized, and cold pressed. People considered HPP as (1) unfamiliar, (2) processed, (3) pressurized, (4) packaged and stored, (5) containing additives, preservatives, and other ingredients, and (6) bad or artificial (Martins et al. 2019). In contrast, Mireaux et al. (2007) found that Australian consumer acceptance of HPP orange juice was similar to the acceptance of freshly squeezed and pasteurized orange juice. To our knowledge, no research on consumer acceptance of HPP has been carried out in Germany and Switzerland.

Third, information about the processing technology increased the acceptance of HPP pineapple juice (Deliza et al. 2003) and consumers' willingness to pay for HPP ready to eat food (Hicks et al. 2009). Moreover, information about the benefits of HPP positively impacts consumers' purchase intention. In detail, information about higher vitamin content, preserved taste, smell, and color, and environmental benefits lead to a high acceptance of HPP apple juice (Sonne et al. 2012).

Last, compared to other new processing technologies consumers seem to have a rather positive perception of HPP due to better food safety, quality, and extended shelf life, environmental benefits, safety issues of workers, and positive attitudes towards the name of the technology (Cardello et al. 2007; Frewer et al. 2011).

3. Main objectives and research questions

Based on the overall objectives of the ProOrg project and the state of the art presented in the previous chapter, the main objectives and research questions were derived. The two main objectives of the consumer study were:

1. To investigate organic consumers' acceptance of processing methods for organic food; and
2. To examine if careful processing may be a – from the perspective of organic consumers – suitable concept to assess the adequacy of processing methods for organic food.

For this purpose we chose fresh milk as case study product and compared consumer acceptance for pasteurized, micro filtrated & pasteurised, and HPP milk, i.e. milk treated with high pressure. However, as consumer acceptance towards processing may be very product specific, consumer perceptions and expectations were also assessed for food more generally.

To achieve the abovementioned objectives, the study aimed at answering the following research questions:

1. What role does processing play in consumers' milk choice behaviour?

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

   a. Are consumers familiar with the processing methods used to extend the shelf life of milk?
   b. Is processing an important purchase criterion for milk?
   c. Which processing method used to extend the shelf life of milk do consumers prefer and why?
2. What role does "careful processing" play in consumers' milk choice behaviour?
   a. How are consumers' preferences for milk processing methods influenced by information about the effect of processing on taste and vitamins?
3. What role does "careful processing" play in consumers' food choice more generally?
   a. How is the concept of "careful processing" understood by consumers?
   b. Which processing methods do consumers perceive as careful?
   c. Is careful/ minimal processing important to consumers?
4. What are organic consumers' expectations towards the processing of organic food?
   a. Which processing methods do organic consumers perceive as suitable for organic food?
   b. Is careful/ minimal processing important to consumers in the context of organic food?

As results may differ between regular and irregular organic consumers as well as between 'modern' and 'traditional' consumers, all research questions were analysed by organic purchase frequency and, where considered relevant, also by food technology neophobia. The results section follows the order of the above listed research questions.

4. Methods

An online survey, combined with a choice experiment, was chosen as a quantitative survey method to collect primary data from a defined study population. For this purpose, a cross sectional study was selected, that is a one-time conducted survey to get a snapshot of current consumer perceptions and expectations (Döring and Bortz 2016). The quantitative study was expected to provide a representative sample of the population with regard to age, gender and regional distribution from which conclusions can be drawn to the entire population. Online surveys are more cost- and time-efficient as compared to other quantitative data collection methods. Furthermore, online surveys and in-person surveys do not necessarily obtain significantly different information (Canavari et al. 2005). In this study an online survey was used as two relatively large samples of minimally 600 respondents each were needed.

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

4.1 Sampling

The questionnaire was completed by respondents in Germany and the German-speaking part of Switzerland. Germany and Switzerland have been selected as countries of research as part of the task distribution of the project partners in the ProOrg project. Differences between the two countries with respect to currency, terminology, organic labels, and sociodemographic data were taken into account in the questionnaire wording.

The underlying population of the study was defined as follows: participants had to be between 18 to 75 years old, not working in food production, processing, or trade, market research, or marketing, and living in Germany or German-speaking Switzerland. Furthermore, participants had to be responsible or partially responsible for the food purchase of their household and, as milk was used as sample product in the survey, their weekly household consumption of milk had to be at least 0.1 l. In addition, as the study was conducted online, participation was limited to internet users. However, nowadays this includes nearly the entire population of Germany and Switzerland. A quota sample was drawn to get a representative sample of the study population (Döring and Bortz 2016). Quotas were applied to age, gender, and federal states or cantons and based on current population data (BfS 2019, Tessmar 2019). Deviations for the population with internet access were expected to be small as 99% of German and Swiss consumers use the internet. Quotas for age and gender were interlocked. The targeted and achieved quotas for gender and age are presented in Table 2.

Table 2: Interlocked targeted (T) and achieved (A) quotas for gender and age categories

	German sample (n = 600)				Swiss sample (n = 687)				
Gender	**Female**		**Male**		**Female**		**Male**		**Diverse**[1]
Age	**T**	**A**	**T**	**A**	**T**	**A**	**T**	**A**	**A**
18-29	8.0	8.0	8.8	8.8	9.6	9.3	10.1	8.3	0.1
30-39	7.4	7.3	7.7	7.7	9.4	9.5	9.6	9.2	0.1
40-49	7.7	7.7	7.8	7.8	9.6	9.6	9.7	9.8	0.0

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

50-59	9.6	9.7	9.7	9.7	9.9	10.2	10.1	9.9	0.1
60-75	18.4	18.3	15.0	15.0	11.3	12.1	10.6	11.8	0.0
Total	51.1	51.0	48.9	49.0	49.9	50.7	50.1	48.9	0.4

Targeted (tar.) and achieved (ach.) quotas are given in percent.
[1]People who defined themselves as third gender were not screened out of the questionnaire, their data was listed in a third category. Third gender refers to people who categorize themselves as 'diverse' or 'other', i.e. as neither male nor female.

The targeted and achieved quotas for the regions of Germany and German-speaking Switzerland are shown in Table 3. The deviations between the targeted and achieved quotas are only small. Hence, samples can be considered representative for Germany and German-speaking Switzerland with respect to age, gender, and regions.

Table 3: Targeted (T) and achieved (A) quotas for federal states in Germany and cantons in German-speaking Switzerland

German sample (n = 600)		**Swiss sample (n = 687)**		
Federal State	**T & A**	**Canton**	**T**	**A**
Baden-Württemberg	13	Argovia	11	11.4
Bavaria	15	Appenzell	1	1.4
Berlin	4			
Brandenburg	3	Basel (city & country)	8	8.5
Bremen	1	Bern	17	17.9
Hamburg	2	Freiburg	5	2.8
Hesse	7	Glarus	1	0.7
Mecklenburg-Western Pomerania	2	Grisons	3	3.3
Lower Saxony	11	Lucerne	6	6.6
North Rhine-Westphalia	22	Nidwald	1	1.0
Rhineland-Palatinate	5	Obwald	1	0.6

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Saarland	1	Schaffhausen	1	1.3
Saxony	5	Schwyz	2	2.2
Saxony-Anhalt	3	Solothurn	4	4.1
Schleswig-Holstein	3	St. Gallen	8	7.7
Thuringia	3	Thurgau	4	3.8
Total	100	Uri	1	0.4
		Zug	2	1.7
		Zurich	24	24.5
		Total	100	100

Targeted (tar.) and achieved (ach.) quotas are given in percent.

In total, valid data of 1287 respondents, 600 German residents and 687 residents of German-speaking Switzerland, was collected. A sample of 600 respondents per country was requested from respondi. The Swiss sample resulted to be larger than the German sample as the filling of the targeted quota took more time and consequently the survey remained in the field for a few more days. The large sample sizes were necessary as each sample was randomly split into two equally sized subsamples or treatment groups in order to analyse the effect of additional information on consumer preferences. In the German sample, each treatment group consisted of 300 respondents, in the Swiss sample treatment group 1 contained 347 people, and treatment group 2 included 340 respondents.

4.2 Online survey

The development of the online survey took 16 weeks. A pre-test of the questionnaire was carried out from the 28th of September 2019 until the 14th of October 2019 with ten people per country. In response to this pre-test, the questionnaire was adjusted and corrected.

The standardized questionnaire contained mainly closed questions. Only four of the questions were open questions. All questions of the questionnaire were binding, however, where considered necessary, a 'I don't know' or 'not relevant' option was provided. Response options (except for scales) and the items of a matrix type question were always randomized, unless they followed a natural order, as it is for example the case for the response options of the variables income and education.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 4: Response options on a 7-Point-Likert scale in the questionnaire

Type of answer	Response options	Question
Quantity	None (1) – very few (2) – rather few (3) – some (4) – rather many (5) – very many (6) – (almost) all (7)	S06
Agreement	Fully disagree (1) – mainly disagree (2) – rather disagree (3) – neither agree nor disagree (4) – rather agree (5) – mainly agree (6) – fully agree (7)	F230, F400, F420, F430, F450, F530, F550, F560, F600
Change	Full (1) – very large (2) – large (3) – moderate (4) – small (5) – very small (6) – none (7)	F440 (Item 1 through 3)
Impact	Very high (2)[1] – high (3) – moderate (4) – low (5) – very low (6) – none (7)	F440 (Item 4)
Frequency	Never (1) – very seldom (2) – rather seldom (3) – sometimes (4) – rather often (5) – very often (6) – (almost) always (7)	F500, F510, F520

[1]Since a complete environmental impact does not exist, the first category (1) was omitted for the measurement of acceptance with respect to environmental impacts.

The response format of all matrix type questions was a 7-Point-Likert scale. Likert scales from 5 to 7 have shown to provide the highest validity (Döring and Bortz 2016). As shown in Table 4, the labelling of the scale varied depending on whether the question asked for a quantity, the level of agreement, an accepted change or impact, or a frequency. All 7-Point-Likert scales in the questionnaire were arranged in a unipolar order. Concerning the questions on agreement, only the extreme ends and the middle option were labelled in accordance with Döring and Bortz (2016) (e.g. 1 = I fully disagree, 4 = I neither agree nor disagree, 7 = I fully agree).

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

4.2.1 Survey structure

Table 5 presents the structure of the survey (see questionnaire in the the Appendix).

Table 5: Survey structure

	Introduction
1.	Screening
	Gender; age; profession; food purchase responsibility in household; place of residence (region); amount of milk consumed in household
2.	Milk consumption
	Importance of milk purchase criteria; knowledge of milk processing methods (open); consumption of raw, pasteurized, and UHT milk
3.	Information treatment on milk processing and evaluation
	Information treatment on pasteurization, micro filtration& pasteurisation, and high pressure processing (HPP); evaluation of information provided with respect to novelty and usefulness
4.	Choice experiment on milk
	Six choice sets with two offers of fresh milk each, differing with respect to processing, geographic origin, production system, and price
5.	Compilation of favourite milk offer
	Compilation of favourite milk offer; explanation of processing method chosen (open)
6.	Careful processing
	Evaluation of processed foods with respect to careful processing; understanding of the concept of careful processing (open); importance and willingness to pay for careful processing; consumer expectations towards careful processing; acceptance of processing-related impacts; opinions on processing-related on-product information, on shelf-life, and packaging
7.	Processing of organic food
	Organic purchase frequency; Demeter purchase frequency; purchase frequency of specific products in organic quality; suitability of processing methods for organic food; explanation of methods not considered suitable (open); organic purchase drivers; expectations and preferences towards the processing of organic food
8.	Food technology neophobia scale (FTNS)
9.	Sociodemographic characteristics

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

	Occupation; household size; education; income
	Ending

In the following, we will describe each survey section in detail, including the design of the choice experiment (section 4).

Section 1: Screening

After a short introduction, respondents were screened to make sure that they fit the target group and to make sure that quotas were appropriately filled. The screening questions asked for respondents' gender, age, profession, food purchase responsibility in the household, place of residence (region), and amount of milk consumed in the household. The questions on gender, age, and place of residence (region) were also used for the control of quotas.

Section 2: Milk consumption

Then, the focus was set on milk. Out of twelve given purchase criteria, including the criterion processing, respondents first had to select their six most important purchase criteria for milk. The twelve purchase criteria were chosen based on the availability of on-product information for milk. In a further step, respondents' were asked about their knowledge of milk processing methods and had to indicate the share of raw milk, pasteurized milk, and UHT milk consumed in their household.

Section 3: Information treatment on milk processing and evaluation

In the next section, participants were randomly split into two treatment groups in order to measure the effect additional information about processing-related impacts would have on consumer preferences for milk (subsequently referred to as treatment group 1 and treatment group 2). Both groups received information on the processing steps of three milk processing methods, including pasteurization, micro filtration & pasteurisation, and high pressure processing (HPP), and the resulting extended shelf life (see

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 6). This information was provided to all participants with the aim to align their knowledge on the three processing methods and to rule out that consumer preferences would be affected by a method's novelty. Both, micro filtration & pasteurisation and high pressure processing were expected to be rather new to consumers, whereas pasteurization was expected to be rather common. Only treatment group 2 then received additional information on the impact of processing on taste, vitamins, and minerals (see Table 7). Based on this additional information, high pressure processing was expected to be perceived as the most 'careful' processing method, since it was described as the method with the lowest impacts.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 6: Information on pasteurization, micro filtration & pasteurisation, and high pressure processing (HPP) given to both treatment groups

Processing method	Procedure	Shelf life
Pasteurization	Preservation through heating: During pasteurization, raw milk is heated up to around 74 degrees for a short time (approximately 20 seconds) and then immediately cooled down. During this process, germs present in milk are destroyed through heating. Pasteurization is a common process to preserve milk.	Unopened and cooled for around 10 days.
Microfiltration	Preservation through filtration and heating: During micro filtration, raw milk is first separated into skimmed milk and cream. Skimmed milk is preheated (up to approximately 50 to 55 degrees) and filtrated, whereby germs present in milk are filtered out. Cream is heated up to approx. 125 degrees for a very short time (approximately two seconds) and then immediately cooled down. The filtered skimmed milk and the cooled cream are merged again and pasteurized (heated up to around 74 degrees for approximately 20 seconds). During this process, germs present in milk are destroyed through filtration and heating. Micro filtration & pasteurisation is a common process to extend the shelf life of pasteurized milk.	Unopened and cooled for around 21 days.
HPP	Preservation through pressure: During high pressure processing the raw milk is first filled into bottles and then placed in a water tank, where it is exposed to a very high pressure of approximately 600 megapascal* for around five minutes. During this process, milk is not heated. Germs present in milk are destroyed by pressure alone.	Unopened and cooled for around 21 days.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

	HPP is a new processing method for the preservation of milk and thus only little in use so far. *For comparison: The pressure in a pressure cooker is maximum 0.2 megapascal.	

Sources: own compilation based on Trujillo et al. (2002); Milchindustrie-Verband e.V. n.d.; The Cold Pressed Raw Milk Process n.d., Preuße n.d.

Table 7: Additional information on processing-related impacts given to treatment group 2 only

Processing may negatively affect the nutrient content and the taste of raw milk:	
General information: Raw milk is an important source for the vitamins *B2, B5, B12, A,* and *D*. The last four are heat sensitive. None of these is sensitive to pressure. Raw milk is also an important source for the minerals *phosphorus, calcium, potassium, zinc, magnesium,* and *iodine*. However, minerals are neither heat-sensitive nor sensitive to pressure.	
Heating: Causes a loss in vitamins: • The more heated, the higher the loss. Causes a change in taste: • The more heated the stronger the cooked taste.	High pressure: Causes no loss in vitamins: • The vitamin content is comparable to raw milk. Causes no change in taste: • The taste is comparable to raw milk.

Sources: own compilation based on Trujillo et al. (2002); Goyal et al. (2013); Stratakos et al. (2019).

After the information was provided, respondents of both groups were asked to evaluate it with respect to its novelty and usefulness. This evaluation was expected to give additional insights on respondents' prior knowledge and their need for more information about milk processing.

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Section 4: Choice experiment on milk

In the subsequent choice experiment, consumers were asked to choose between different offers of fresh milk that differed with regard to the processing method and other selected attributes which were considered relevant for the purchase of milk as well as for the overall project. All the attributes and attribute levels are shown in Table 8.

Table 8. Attributes and attribute levels tested in the choice experiment

Attribute	Attribute levels	
Processing method	1. pasteurised 2. micro filtrated and pasteurised 3. high pressure processed	
Production system	1. non-organic 2. organic	
Geographical origin	1. domestic production 2. regional production	
Homogenisation	1. non-homogenised 2. homogenised	
Price for 1 litre of fresh milk	In Switzerland: 1. 1.55 CHF 2. 1.80 CHF 3. 2.05 CHF 4. 2.30 CHF	In Germany: 1. 0.79 € 2. 1.15 € 3. 1.49 € 4. 1.85 €

The price levels were country-specific and defined based on a price inventory in the respective country. The first price level corresponded to the average price of 1 litre of fresh milk. The second price level corresponded to the average price of 1 litre of organic fresh milk. The two- and threefold difference between these two price levels was then added to the first price level in order to obtain the third and fourth price level, respectively.

The choice experiment was based on an unlabelled fractional factorial d-efficient design. The d-efficient design was chosen in order to achieve high design efficiency (Hensher, Rose & Greene, 2005). The design was developed and improved in eight pre-test rounds.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

The final design consisted of 12 choice sets with two product alternatives in each set. The 12 choice sets were split into two blocks to reduce the consumers' cognitive burden in their choice decisions. Thus, each respondent was presented with a total of six choice sets and was each time asked to choose one of two milk alternatives provided.

To further increase realism, consumers were also able to choose none of the three alternatives presented in each choice set if none of the alternatives was convenient. This 'no choice' option was included to avoid bias caused by forced choices (Dhar & Simonson, 2003).

To reduce the hypothetical bias of stated preference approaches, which may result in over-estimation of consumers' willingness to pay for certain attributes, we used a so called cheap-talk script in the introduction to the choice experiment (Carlsson et al. 2005): participants were told that there are no right or wrong answers and were asked to make decisions which are as close as possible to the decisions they would make in real life.

Figure 1 and Figure 2 show an example of a choice set as it was presented to respondents of treatment group 1 and treatment group 2, respectively.

Which offer of fresh milk would you buy? Please always choose the offer that is most attractive to you. If none of the two offers appeals to you, you can also choose 'none of these offers'.

Note: It might be that an offer does not seem reasonable to you. Nevertheless, please imagine that this offer is actually available in the cooling shelf of the supermarket and that you are able to buy it.

	Offer 1	Offer 2	
Processing method	**Pasteurised** Shelf-life: Unopened and cooled about 10 days.	**Microfiltred and pasteurised** Shelf-life: Unopened and cooled about 21 days.	**None of these offers**
Production system	Organic	Not organic	
Origin	Germany, regional	Germany, not regional	
Homogenisation	Not homogenised	Homogenised	
Price per litre	1,49 €	1.15 €	
My choice	☐	☐	

Figure 1: Example of a choice set as it was provided to respondents of treatment group 1.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Which offer of fresh milk would you buy? Please always choose the offer that is most attractive to you. If none of the two offers appeals to you, you can also choose 'none of these offers'.

Note: It might be that an offer does not seem reasonable to you. Nevertheless, please imagine that this offer is actually available in the cooling shelf of the supermarket and that you are able to buy it.

	Offer 1	Offer 2	
Processing method	**Pasteurised** Shelf-life: Unopened and cooled about 10 days. Minerals: no loss Vitamins: loss of about 20% Taste: very small cooking taste	**Microfiltred and pasteurised** Shelf-life: Unopened and cooled about 21 days. Minerals: no loss Vitamins: loss of about 20% Taste: small cooking taste	**None of these offers**
Production system	Organic	Not organic	
Origin	Germany, regional	Germany, not regional	
Homogenisation	Not homogenised	Homogenised	
Price per litre	1,49 €	1.15 €	
My choice	☐	☐	

Figure 2: Example of a choice set as it was provided to respondents of treatment group 2.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Section 5: Compilation of favourite milk offer

After having completed the choice experiment, consumers were asked to compile their preferred milk alternative and to indicate their maximum willingness to pay for it. They were also asked to explain their preference with respect to the processing method chosen.

Section 6: Careful processing

For the next section of the questionnaire, the focus was extended to processed food products more generally and the topic of careful food processing. First, respondents were asked to evaluate a set of eight selected processed food products with respect to careful processing. These products included pasteurised milk, micro filtrated & pasteurised milk, high pressure processed milk, UHT milk, cold extruded pasta, hot extruded cereals, and fruit juice treated with pulsed electric fields (PEF). For each product respondents could click on an info button in order to access information about the processing method. Second, they were asked to describe what careful processing meant to them. Third, they had to indicate the importance they attributed to careful processing and their willingness to pay more for carefully processed foods. Fourth, they were asked to evaluate different statements on the quality of carefully processed foods. Fifth, they were asked to indicate their acceptance with respect to processing-related impacts on taste, vitamins, minerals, and the environment. Finally, they had to state the importance they attributed to processing-related on-product information, shelf-life, and environmentally friendly packaging. All of these questions were aimed at eliciting respondents' perceptions, expectations, and preferences with respect to careful processing.

Section 7: Processing of organic food

Then, there was a section on organic food. First, respondents were asked about their purchase frequency of organic food. Second, respondents who had stated to purchase organic food at least very seldom were asked to evaluate a set of eight different processing methods with respect to their suitability for organic food. As in the section on careful processing, these methods included pasteurisation, micro filtration & pasteurisation, high pressure processing (HPP), ultra high temperature (UHT) processing, cold extrusion, hot extrusion, pulsed electric fields (PEF), and homogenization. Again respondents could access information on the processing method by clicking on an info button. After this evaluation, respondents who had rated at least one method with a value of 3 or below were asked to explain their evaluation. Next, all respondents were asked to indicate their agreement with different statements on the quality of organic food. Respondents who had stated to purchase organic food at least very seldom were also asked to indicate their agreement with different statements on organic food processing. All of these questions were aimed at eliciting (organic)

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

consumers' perceptions, expectations, and preferences with respect to the processing of organic food.

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Section 8: Food technology neophobia scale (FTNS)

Next, an abbreviated version of the food technology neophobia scale (FTNS) was used to measure respondents' aversion towards new food technologies. The original version of Cox and Evans (2008) contains 13 statements, some of which are formulated in favour and others against new technologies. The abbreviated version, which was proposed by Sajdakowska et al. (2018), contains only four statements, which, unlike in Cox and Evans (2008), are all formulated against new technologies. In this study, the four items proposed by Sajdakowska et al. (2018) were used, however, statements were formulated as in the original version by Cox and Evans (2008). Hence, the selected statements were (1) 'New food technologies decrease the natural quality of food.' (2) 'Society should not depend heavily on technologies to solve its food problems.' (3) 'New food technologies may have long-term negative environmental effects.', and (4) 'New food technologies are unlikely to have long-term negative health effects'. As the questionnaire was in German, the translation was adapted from Lammers et al. (2019).

Section 9: Socio-demographic characteristics

In the last section, respondents were asked to complete questions on selected socio-demographic characteristics, including occupation, household size, household composition, dietary restrictions, highest level of education, and income. At the end of the survey respondents were thanked for their participation and redirected to the website of respondi where they were remunerated for their time.

4.3 Data analysis

4.3.1 Analysis of survey results

The data was analysed using SPSS and R. For all variables which were measured on a 7-point Likert scale, differences between two or more groups were analysed using non-parametric tests, namely the Wilcoxon signed rank test and the Kruskal-Wallis test. Correlations between these variables were analysed using the Spearman test.

To analyse the influence of product attributes on maximum willingness to pay (which was obtained in section 5 of the questionnaire), a multiple linear regression was performed. To analyse the dependence of two categorical or dummy variables, the chi-squared test was used. For all tests, the level of significance was set to $p \leq 0.05$. The data, which was provided by respondi, had already been anonymized and cleaned with respect to so-called 'speeders' (RESPONDI 2019).

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

4.3.2 Analysis of choice experiment

The data of the choice experiment was analysed with the Software nlogit5. The choice experiment approach is consistent with Lancaster's theory of consumer choice (Lancaster, 1966). According to the theory, consumption decisions are determined by the utility that is derived from the attributes of a good. The econometric basis of the approach builts on the behavioural framework of random utility theory, which describes discrete choices in a utility maximizing framework (McFadden, 1974, Ben-Akiva and Lerman, 1985). The responses obtained from choice experiments are analysed to estimate the marginal values of attributes of a good.

In this study, we employ latent class models (LCM) following the apporah of Gil, Gracia and Sanchez (2000) and estimated individual preferences for different milk processing methods for milk preservation. Besides, we analysed consumers' preferences for homogeneised versus non-hmogenised milk, and their preferences for organic and regional milk. Finally, we investigated the price sensitivity of consumers in different segments. The premise of the latent class model is that a population consists of a number of unobserved (or latent) groups of individuals (segments). The latter show relatively homogeneous preferences. However, the segments are assumed to differ substantially in their preferences tructures. Accordingly, the main objective in the estimation of the LCM model is to identify the existence and the number of segments, estimate the preference structure within each segment, and relate membership in each segment to consumer characteristics.

The LCM was applied in this research as following: It was assumed that anindividual n makes a choice by selecting a preferred milk alternative from a set of $J = 2$ alternatives (in this research plus a no-choice option) which varied in terms of the processing method (pasteurisation, micro filtration & pasteurisation and high pressure pasteurisation). Besides, they differed in terms of homogenisation, geographical origin, production system and price. The product specific attributes and levels included in the choice experiment are described in chapter 4, section 4. The attributes of alternative i faced by respondent n are collectively labelled as vector x_{in}. Supposing that individual n belongs to segment s, then the individual's utility function associated with the preferred alternative i is:

$$U(in|s) = s x_{in} + \varepsilon_{in}|s \qquad (1)$$

where s represents the segment-specific preference parameters to be estimatedand $\varepsilon_{in}|s$ is a random term that is assumed to be independent and identically distributed according to an extreme value distribution. The probability that individual n chooses alternative i, conditional on belonging to a given segment s, is (Lancester, 1966):

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

$$P\ (in \mid \beta_s) = \frac{\exp(\beta'_s X_{in})}{\sum_j^J \exp(\beta'_s X_{jn})} \quad (2)$$

The log-likelihood for the LCM with latent segments is given by:

$$\text{LL} = \sum_n^N \ln\left[\sum_{s=1}^S P(s) P(in \mid \beta_s)\right] \quad , \quad (3)$$

where *P(s)* is the probability that an tindividual *n* belongs to segment *s* and β_s is is a vector of segment-specific coefficients to be estimated.

Following Hensher and Greene (2003), *P(s)* is specified to have the standard multinomial logit form:

$$P(s) = \frac{\exp\ (\lambda_S Z_n)}{\sum_{s=1}^S \exp(\lambda_s z_n)} \quad , \quad (4)$$

where z_n is a set of observed individual characteristics and λ_s is a vector of segment-specific parameters to be estimated that denote the contribution of individual charactistics to the probability of segment membership. In this study, the individual characteristics were the organic consumption frequency and milk consumption habits (namely the portion of UHT and pasteurised milk consumption consumed in everyday life in percent).

The goodness of fit of the models is given by the Adjusted R^2. A likelihood ratio of $p < 0.05$ shows that the respective model fits significantly better than a model with no predictors.

5. Results

In this chapter, the results of the survey will be presented. Chapter 5.1 describes the sociodemographic characteristics of both samples and the two treatment groups. It also describes respondents' organic purchase freqeuncy and food technology neophobia. Chapter 5.2 reports the results on respondents' milk consumption behavior, their knowledge and their preferences with respect to milk processing. Chapter 5.3 and 5.4 show the results on respondents' perceptions, expectations, and preferences with respect to careful and organic food processing, respectively. In chapter 6 results are summarized and conclusions are drawn. In Chapter 7 some recommendations for the Code of Practice are derived.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

5.1 Description of the samples

5.1.1 Sociodemographic characteristics

The mean age of respondents was 49.10 (n = 600) in the German and 46.55 (n = 687) in the Swiss sample. The requested interlocked quotas for gender and age categories and the quotas for regions were fulfilled in the German sample (see Table 2 and 3 in Chapter 3.1). In the Swiss sample, slightly more female respondents were recruited in the age categories 50 to 59 years and 60 to 75 years and slightly fewer female respondents in the younger age categories. The number of Swiss male respondents in the sample are lower than the requested quotas in all age categories except for 40 to 49 years old respondents (see Table 2 in Chapter 3.1). Furthermore, in the regions Freiburg, Uri, Obwalden and Glarus, the requested quotas were not fulfilled. However, except for Freiburg, the sample composition does only slightly deviate from the requested quotas (see Table 3 in Chapter 3.1).

In the following, an verview of the sample composition with regard to highestlevel of education achieved, monthly income, employment, and household size is provided.

In the German sample, 29% of respondents achieved university degree (Bachelor/Master/PhD, University/University of Applied Sciences), whereas the share of Swiss respondents in this category was slightly lower (24%). The category with the highest shares in Germany and Switzerland was „apprenticeship“ (37% of the respondents) 21% of Swiss respondents did a Meister or a higher vocational school. 17% German and 12% of Swiss respondents had a high school certificate or vocational baccalaureate diploma, 16% of German respondents had a secondary school certificate. Only 5% of the Swiss respondents had a lower school leaving qualification.

In the German sample, 57% of all respondents had a monthly household net income of up to 3,000 €. The monthly household income of 27% of German respondents was 3,000 € to 6,000 € while it was more than 6,000 € for 5% of German respondents. 11% of the respondents preferred not to answer. In the Swiss sample, 75% of respondents' monthly gross household income was between 2,000 and 15,000 CHF. 5% of the respondents had a monthly gross household income lower than 2,000 CHF and 4% of the respondents had a monthly gross household income higher than 15,000 CHF. 15% of Swiss respondents preferred not to answer. Almost 60% of German respondents indicated to be fully or part-time employed, 13% stated to be out of work, and 28% to be retired. 72% of Swiss respondents declared to be fully or part-time employed, 12% indicated to be out of work, and 17% to be retired.

The mean household size of the German sample was 2.15 persons (n = 600), the mean household size of the Swiss sample was 2.35 persons (n = 687). In the German sample, 29 % of the respondents lived alone, 45% with one other person, 15% in three person

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

households, 9% in four-person households, and 3% in households of five or more people. In the Swiss sample, 25% of the respondents lived alone, 41% with one other person, 15% lived in households of three, 14% in households of four, and 5% in households of five or more people. The share of respondents living in households of one or two people is higher among German than Swiss respondents.

Sociodemographic differences between the two treatment groups

The treatment groups were compared to examine whether the interlocked quotas for age and gender, and the quotas for regions were fulfilled in both samples. Furthermore, the treatment groups were analysed to identify major differences in education, income, employment, and household size.

The interlocked quotas for gender and age were almost fulfilled in the treatment groups. In the treatment groups of both samples, the distribution of male and female respondents within the age groups deviated by maximum 1% from the requested quotas. The only exception was a 2% difference between 18 to 29 years old Swiss males (group 2) and 60 to 75 years old Swiss males (group 1) from the requested quota. However, both categories showed the highest overall deviation from the requested quotas (see Table 2 in Chapter 3.1).

Furthermore, respondents from different regions were relatively equally distributed among the treatment groups. In the German sample, treatment group 1 contained 3% more respondents from North Rhine-Westphalia. All other deviations in both samples were 2% or less. Moreover, the treatment groups did not show large deviations in terms of highest level of education. In the German sample, treatment group 1 held 3% more respondents who did an apprenticeship, and 3% more people who had a secondary school certificate. All other deviations were 2% or less in both samples. Concerning monthly household income, treatment group 1 in the German sample contained 5% more people with a monthly household net income of up to 2,000 € and 3% less respondents with a monthly income of 2,501 to 3,000 €. In the Swiss sample, 4% less people with an income of 6,001 to 10,000 CHF were found in treatment group 1. All other deviations between the treatment groups were 2% or less.

The distribution of employed, out of work, and retired people among the treatment groups was almost equal in both samples. However, in the German sample, more people were fully employed and less than 50% employed in treatment group 1 compared to treatment group 2. Consequently, less German respondents were between 50% to 89% employment in treatment group 1. In the Swiss sample, more fully employed people were found treatment group 1. Household size was almost equal in both treatment groups in the German and the Swiss sample.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

To conclude, the treatment groups can be considered as equal in terms of gender and age, region, employment, and household size.

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

5.1.2 Organic food purchase frequency

The organic purchase frequency of German and Swiss respondents is presented in Figure 3. In general, Swiss respondents (M = 4.18, SD = 1.57, n = 687) stated to buy organic food more often than German respondents (M = 3.85, SD = 1.68, n = 600).

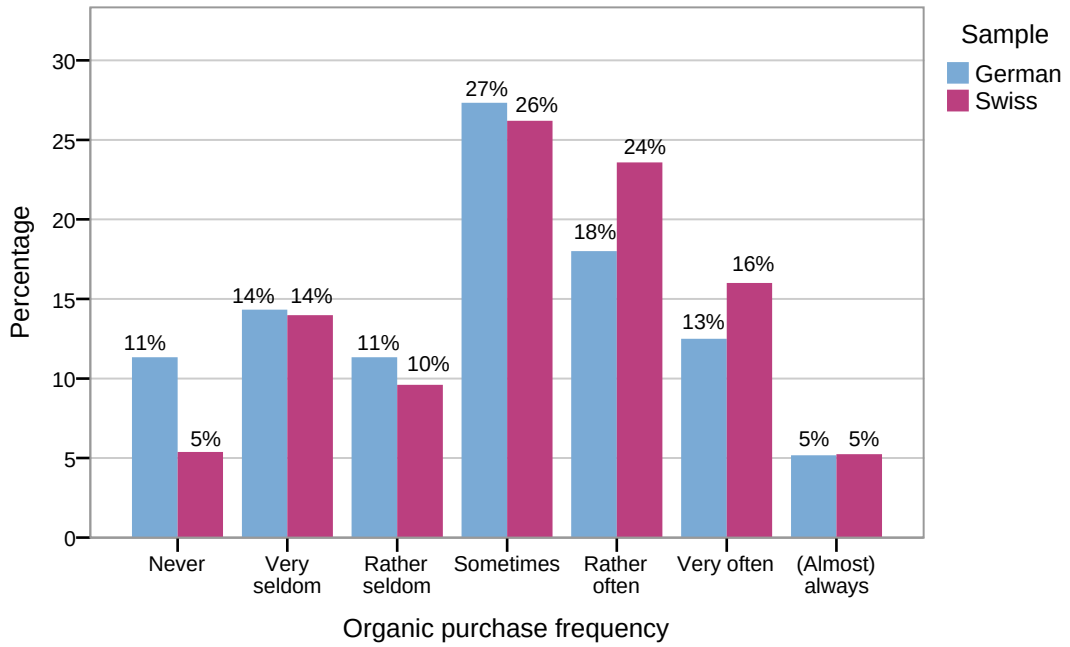

Figure 3: Organic purchase frequency of German [n = 600] and Swiss [n = 687] respondents (question F500). The x-axis is based on a 7-Point-Likert scale: 1 = never to 7 = (almost) always.

Figure 4 and Figure 5 show the frequency by which respondents stated to buy certain food products in organic quality. The higher the mean, the more frequent respondents bought a certain product in organic quality. The food products which were stated to be bought most frequently in organic quality were eggs, vegetables, and fruits, in both samples. In the German sample, milk, cheese, other milk products, and fresh meat followed these while in the Swiss sample other milk products and milk were switched in position.

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

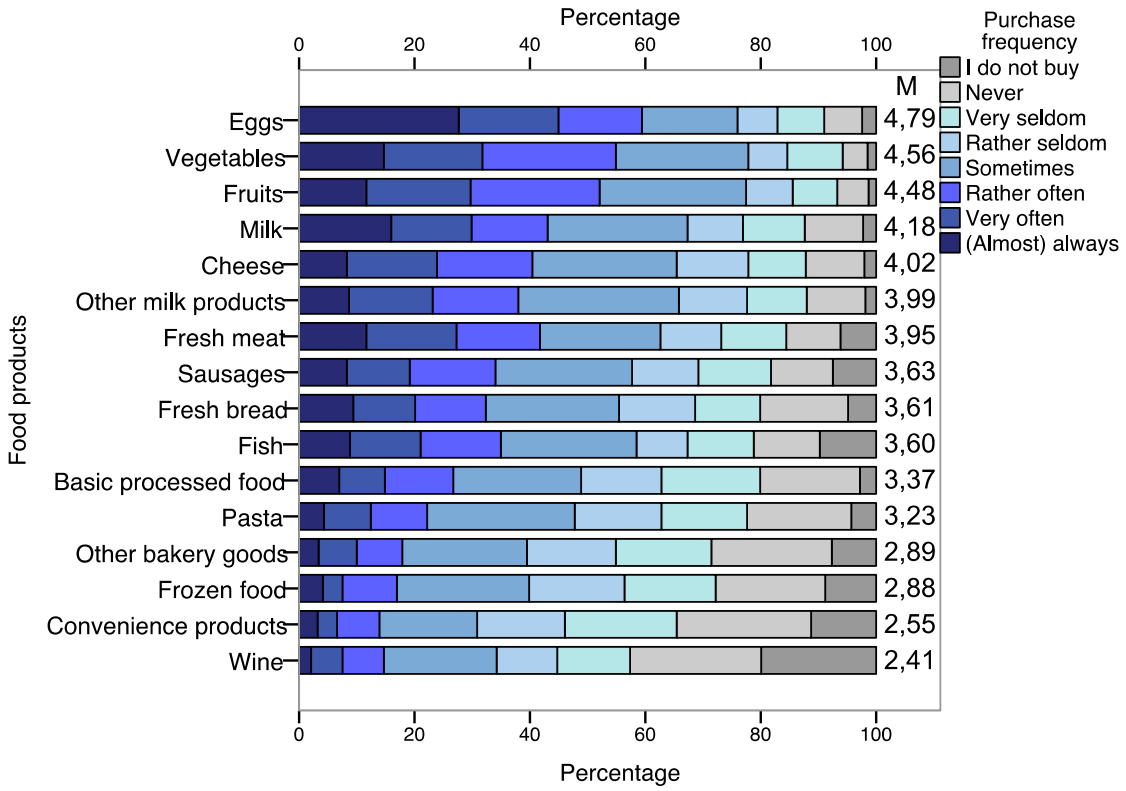

Figure 4: Organic purchase frequency of specific food products in the German sample [n = 532] (question F520). Filter: Buys organic food.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

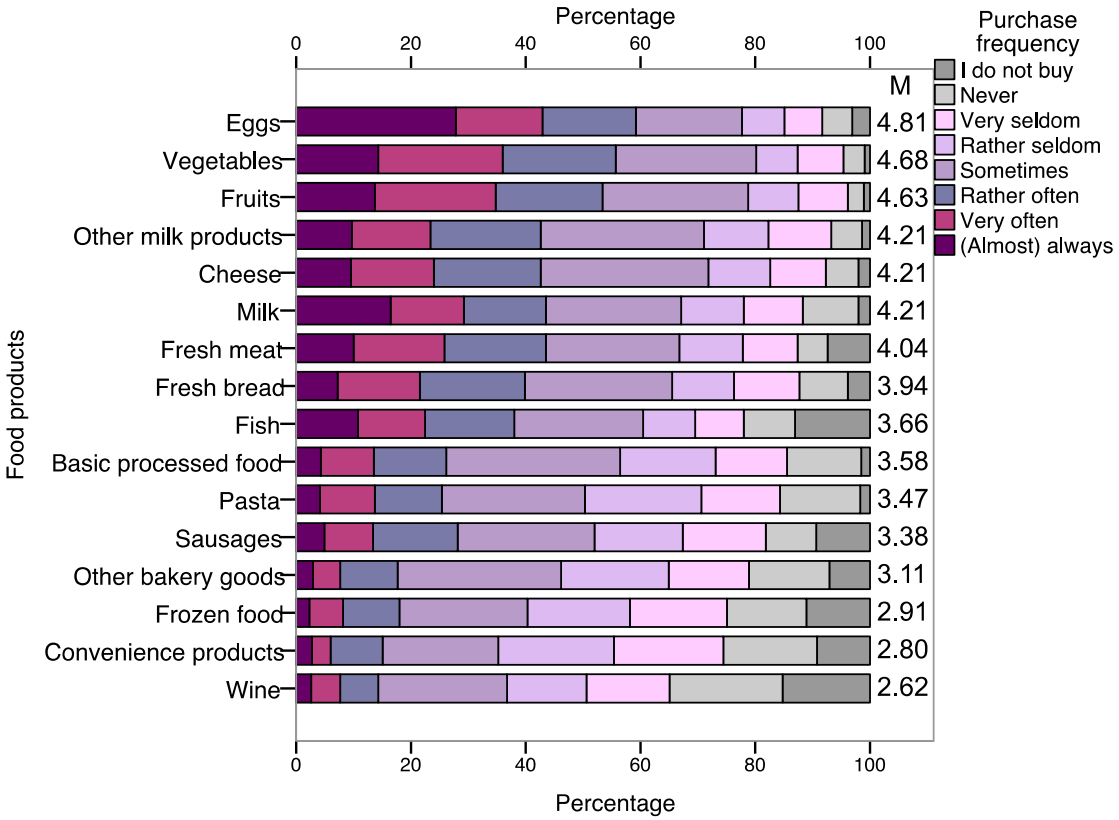

Figure 5: Organic purchase frequency of specific food products in the Swiss sample [n = 650] (question F520). Filter: Buys organic food.

As Demeter is the organic food labelling organization with the most stringent standards and regulations with respect to production and processing, the purchase frequency of Demeter products was also elicited. In contrast to the overall organic purchase frequency, the purchase frequency of Demeter food was found to be higher in the German (M = 2.77, SD = 1.58, n = 532) than in the Swiss sample (M = 2.37, SD = 1.48, n = 650), which might be related to the German origin of the label. Thus, 30% of German and 40% of Swiss respondents indicated to never buy Demeter products, 57% of German and 49% of Swiss respondents stated to purchase Demeter products very or rather seldom or sometimes, and 13% of German and 11% of Swiss respondents indicated to buy Demeter products at least rather often or more frequently.

As shown in Figure 6 the purchase frequency of Demeter products increases with the purchase frequency of organic food, in particular in the German sample. However, in both samples the purchase frequency of Demeter products still varies substantially, also for consumers with a high organic purchase frequency.

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

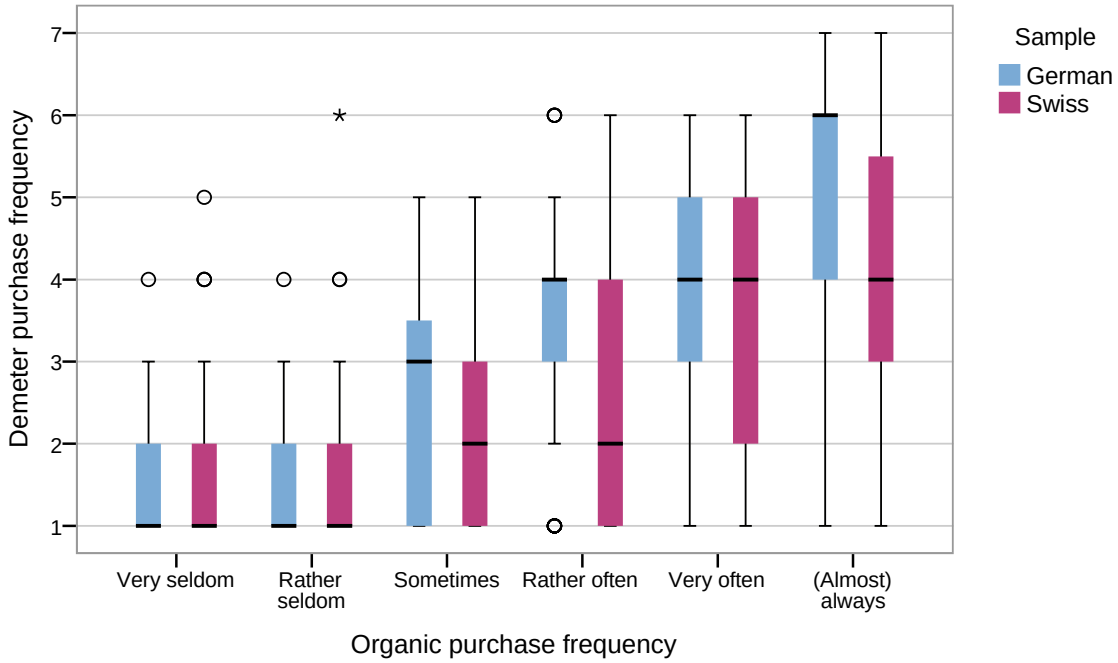

Figure 6: Relation between the purchase frequency of organic food (F500) and the purchase frequency of Demeter products (F510) for German [n = 532] and Swiss [n = 650] respondents, who at least very seldom buy organic food. Spearman's correlation coefficient for German respondents: 0.64 (p-value < 0.001); Spearman's correlation coefficient for Swiss consumers: 0.49 (p-value < 0.001). The y-axis is based on a 7-Point-Likert scale: 1 = never to 7 = (almost) always.

For further analysis, organic consumption frequency was split into three groups: heavy organic consumers, who stated to purchase organic food very often or (almost) always (denoted as OC3); occasional organic consumers, who stated to purchase organic food sometimes or rather often (denoted as OC2); and light organic consumers, who stated to purchase organic food never, very seldom, or rather seldom (denoted as OC1).

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

5.1.2.1 Sociodemographic drivers of organic food purchase frequency

Table 9 and

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 10 show the results of the multiple linear regressions that were run to examine sociodemographic drivers of organic food purchase frequency for German and Swiss respondents. The independent variables included in the model were age, gender, income, education, and household size.

Table 9: Results of multiple regression of sociodemographics on organic food purchase frequency of German respondents.

Variable	Coefficient	Lower bound (2.5%)	Upper bound (97.5%)	Std. error	p-value
Age	-0.01	-0.02	0.00	0.00	0.180
Gender (ref = male)	0.62	0.35	0.88	0.14	0.000
Income	-	-	-	-	0.000
Education	-	-	-	-	0.171
HHsize	0.13	-0.02	0.27	0.07	0.089
Constant	4.87	2.57	7.16	1.17	0.000
Adjusted R2	0.08				
n	600				

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 10: Results of multiple regression of sociodemographics on organic food purchase frequency of Swiss respondents.

Variable	Coefficient	Lower bound (2.5%)	Upper bound (97.5%)	Std. error	p-value
Age	0.00	-0.00	0.01	0.00	0.277
Gender (ref = male)	0.06	-0.18	0.30	0.12	0.63
Income	-	-	-	-	0.004
Education	-	-	-	-	0.001
HHsize	0.02	-0.08	0.12	0.05	0.732
Constant	2.75	1.84	3.67	0.47	0.000
Adjusted R2	0.05				
n	687				

In the German sample, women were found to purchase organic food more frequently. In addition, organic purchase frequency was found to increase with increasing income. Age, education, and household size were not found to have any significant impact on the purchase frequency of organic food. With an adjusted R squared of 8%, the explanatory power of the model can be considered rather weak Cohen (1988).

In the Swiss sample, organic food purchase frequency was found to increase with increasing income and education. Age, gender, and household size were not found to have any significant impact on the purchase frequency of organic food. With an adjusted R squared of 5%, the explanatory power of the model can also be considered rather weak Cohen (1988).

Hence, neither in the German nor in the Swiss sample, sociodemographic variables were found to be good predictors of organic food purchase frequency.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

5.1.3 Food technology neophobia (FTN)

To measure respondents' aversion towards new food technologies, an abbreviated version of the food technology neophobia scale (FTNS) was used, which consisted of a total of four statements. Three of these statements were formulated against new technologies (F600_1 through F600_3) and one statement was formulated in favour of new technologies (F600_4). Table 11 shows German and Swiss respondents' agreement with these four statements. Results for statement F600_4 are reported for its original version, as it was stated in the questionnaire, and its reversed version.

Table 11: Results for the abbreviated version of the food technology neophobia scale (FTNS).

Statements:	Country	Mean[1]	Std. dev.[1]	p-value
F600_1: New food technologies decrease the natural quality of food.	DE [600]	4.21	1.44	0.708
	CH [687]	4.16	1.51	
F600_2: Society should not depend heavily on technologies to solve its food problems.	DE [600]	4.68	1.49	0.278
	CH [687]	4.58	1.50	
F600_3: New food technologies may have long-term negative environmental effects.	DE [600]	4.47	1.36	0.564
	CH [687]	4.48	1.46	
F600_4 original: New food technologies are unlikely to have long-term negative health effects.	DE [600]	4.05	1.39	0.601
	CH [687]	4.01	1.42	
F600_4 reversed: New food technologies may have long-term negative health effects.	DE [600]	3.95	1.39	0.599
	CH [687]	3.99	1.42	

[1]Values are based on a 7-Point-Likert scale: 1 = fully disagree to 7 = fully agree.

Overall, respondents' agreement with the four statements was not very high, with mean values ranging between the score 4 and 5.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Between country samples no significant difference in agreement was found, for none of the four statements. Between statements significant differences were found, except for the first and fourth statement in the German sample and the second and third statement in the Swiss sample.

In both samples, statement two and three had the highest agreement and statement one and four the lowest agreement. Statement four, which was the only statement in favour of new technologies, had the lowest agreement overall, both in its original and reversed version.

Hence, the average German and the average Swiss respondent tended to agree that "society should not depend heavily on technologies to solve its food problems" and that "new food technologies may have long-term negative environmental effects"; but were undecided if "new food technologies decrease the natural quality of food" and if "new food technologies are likely to have long term negative health effects (reversed version)".

Except for the fourth statement (F600_4), all statements are positively correlated with organic food purchase frequency. However, the correlation coefficients are relatively low, ranging from 0.09 to 0.12.

5.2 Processing of milk

5.2.1 Current milk purchase behaviour

Figure 7 shows the distribution of milk consumption among respondents by country. Excluding extreme outliers (≥ 14 liters), the average weekly household consumption of milk was 2.70 liters (SD = 2.31, n = 594) in the German sample and 2.67 liters (SD = 2.34, n = 673) in the Swiss sample.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

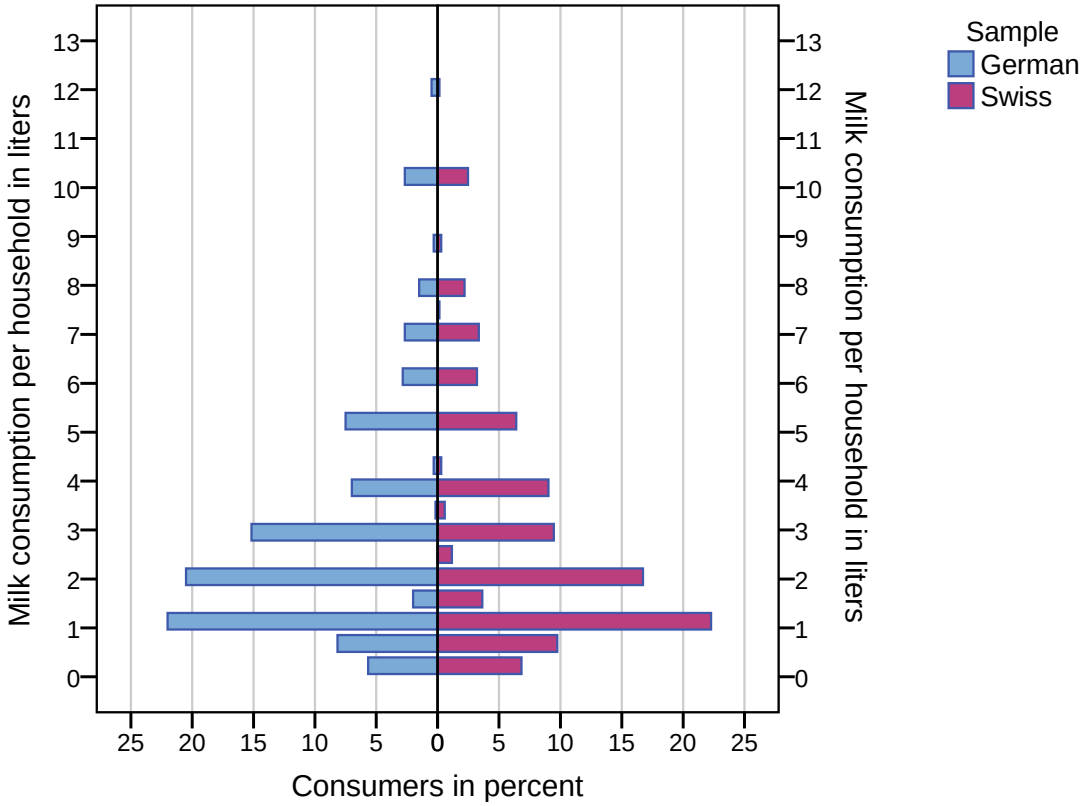

Figure 7: German [n = 594] and Swiss [n = 673] respondents' weekly household milk consumption. Extreme outliers (≥14 liters) were excluded (question S07).

On average, German respondents' [n = 600] milk consumption consisted to 60% (SD = 42%) of UHT milk, to 36% (SD = 40%) of pasteurized milk, and to 4% (SD = 15%) of raw milk. Swiss respondents' [n = 687] milk consumption consisted, on average, to 49% (SD = 43%) of UHT milk, 43% (SD = 42%) pasteurized milk, and 8% (SD = 23%) raw milk. Thus, the average German respondent stated to consume significantly more UHT milk than pasteurized milk, whereas for the average Swiss respondent the stated amounts were more balanced. However, as shown in Figure 8 and Figure 9, there was a substantial variation in shares among respondents, within both samples.

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

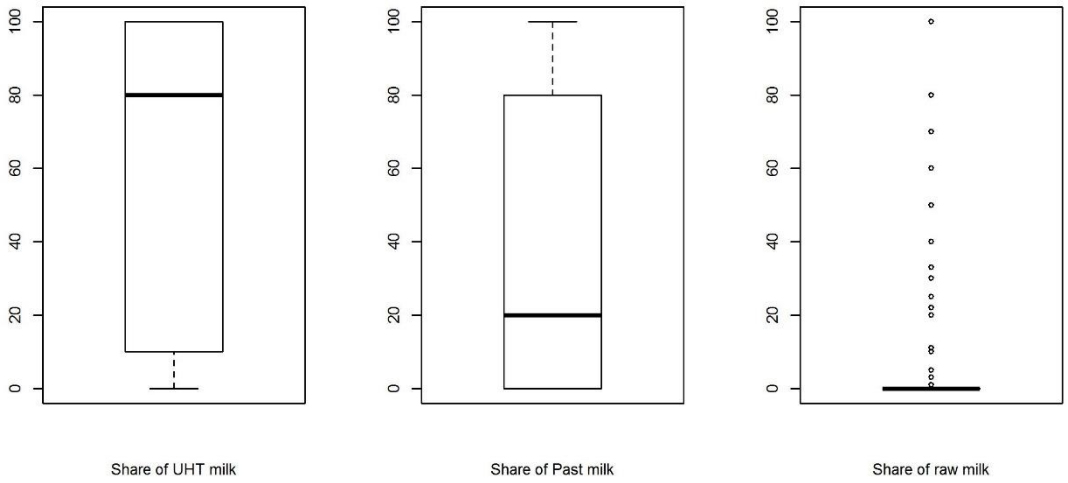

Figure 8: Distribution of the share of processed milk (UHT, Past, and raw) in total milk consumption for the German sample [n = 600] (question S07).

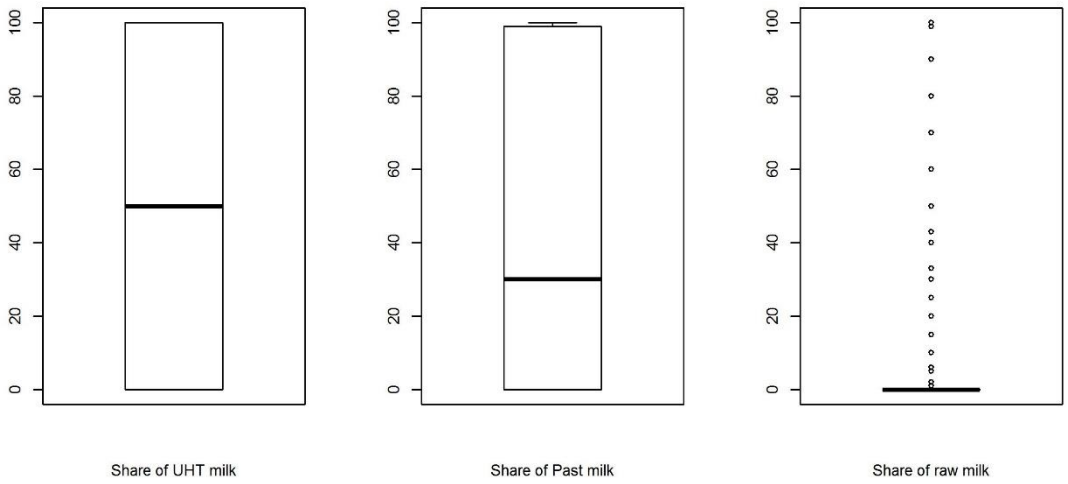

Figure 9: Distribution of the share of processed milk (UHT, Past, and raw) in total milk consumption for the Swiss sample [n = 687] (question S07).

Between the three different groups of organic consumers, substantial differences in shares were found. With increasing organic purchase frequency, the share of UHT milk consumed decreased and the share of pasteurized and raw milk increased. On average, heavy organic consumers' [n = 252] milk consumption consisted to 37% (SD = 39%) of UHT milk, occasional organic consumers' [n = 614] milk consumption to 52% (SD = 42%),

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

and rare organic consumers' [n = 421] milk consumption to 67% (SD = 43%). For pasteurized milk the share was 52% (SD = 39%) in the case of heavy organic consumers, 42% (SD = 41%) in the case of occasional organic consumers, and 30% (SD = 41%) in the case of rare organic consumers. For raw milk, the share was 11% (SD = 25%) in the case of heavy organic consumers, 6% (SD = 19%) in the case of occasional organic consumers, and 4% (SD = 16%) in the case of rare organic consumers.

5.2.2 Knowledge about milk processing

Respondents' knowledge on milk processing was obtained (1) by an open question on the names of processing methods to extend the shelf life of milk; and (2) by having them evaluate the processing-related information, which was provided to them before the choice experiment. As treatment group two was not only informed about a method's processing steps and shelf life, but also about its impacts on vitamins, minerals and taste, this group was also asked to evaluate this additional information.

Respondents' open comments on the names of processing methods to extend the shelf life of milk were divided into five categories. Table 12 shows the frequencies with which open comments related to one of these categories by country.

Table 12: Milk processing methods mentioned by German and Swiss respondents (F110 – open question).

Milk processing method	Country	Mean
Ultra high temperature (UHT): UHT milk; H-milk; UHT; high heating	DE [600]	0.28
	CH [687]	0.53
Pasteurization: pasteurized/ past milk; pasteurization	DE [600]	0.38
	CH [687]	0.45
Heating	DE [600]	0.11
	CH [687]	0.03
Sterilization	DE [600]	0.03
	CH [687]	0.01
Other: filtration, micro filtration, high pasteurization, extended shelf life milk, other	DE [600]	0.02
	CH [687]	0.04

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

As respondents were specifically asked about processing methods used to extend the shelf-life of milk, comments referring to homogenization and skimming – processing methods which are not used for shelf life extension – were not counted. Also comments with respect to brands or the expression "fresh milk" were not counted, as they could not be clearly assigned to a processing method. For instance, in Germany "fresh milk" could refer to raw milk or pasteurized milk.

In both countries, heating, be it in the form of pasteurization or ultra high temperature treatment, was quite well known as a method to extend the shelf life of milk. In contrast, heating in the form of high pasteurization as well as methods other than heating like filtration or pressure were nearly or completely unknown.

Swiss respondents significantly more often related to the category 'UHT' than German respondents. Swiss respondents also more frequently related to the category 'pasteurization'. However, this result may be due to the fact that the category 'pasteurization' does not include comments on fresh milk. Even though fresh milk could also refer to raw milk, in Germany it is very often used for milk which is stored in the cooling shelf, namely pasteurized milk.

The fact that pressure was not mentioned, is not suprising, as high pressure processed (HPP) milk is not on the market yet, neither in Germany nor Switzerland. However, micro filtration & pasteurisation and high pasteurization have been around for some time now. Hence, the fact that they were not mentioned by respondents, indicates, that respondents were completely unaware of these methods.

Table 13 shows the results of the evaluation of processing-related information. The higher the mean values the newer an information was perceived. Therefore, higher mean values are interpreted with lower prior knowledge.

On the one hand, the results suggest that respondents' prior knowledge about the processing steps of milk processing methods was rather low, except for pasteurization. Also the prior knowledge of treatment group two (T2) with respect to processing-related impacts was rather low. On the other hand, the results suggest that the information they received was rather useful, so that participants stated feeling rather well informed in order to decide which type of milk to choose in the store.

Consumers in treatment group two (T2), who received additional information, felt better informed than treatment group one (T1). However, the difference in mean scores was not very large (Mean of 5.58 vs. 5.28).

Swiss respondents seemed to have more prior knowledge about processing than German respondents and to perceive the information provided as less useful for

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

choosing their preferred type of milk in the store. However, again the difference in mean scores was small.

For consumers with a higher purchase frequency of organic food mean scores for statement one (pasteurization) and two (micro filtration) tended to be lower, indicating a higher prior knowledge, however the Spearman's correlation coefficients were very low, indicating a very weak relationship.

Table 13: Evaluation of processing information (F230).

Statements:	Country	Mean[1]	Std. dev.[1]	p-value
F230_1: The info on pasteurization was completely new for me.	DE [600]	3.65	2.11	0.026
	CH [687]	3.40	2.11	
F230_2: The info on micro filtration was completely new for me.	DE [600]	5.61	1.66	0.008
	CH [687]	5.33	1.79	
F230_3: The info on HPP was completely new for me.	DE [600]	5.94	1.60	0.006
	CH [687]	5.67	1.80	
F230_4: The info on the impacts of the processing methods was completely new for me.	DE [300]	5.32	1.66	0.035
	CH [340]	5.02	1.76	
F230_5: With this info I feel well informed, so that I can decide very well which type of milk to choose in the store.	DE [600]	5.51	1.50	0.039
	CH [687]	5.35	1.53	
	T1 [647]	5.28	1.58	0.001
	T2 [640]	5.58	1.44	

[1]Values are based on responses on a 7-Point-Likert Scale: 1 'I fully disagree' to 7 'I fully agree'.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

5.2.3 Consumer preferences for milk processing methods

5.2.3.1 Importance of processing in milk purchase

The importance of food processing in milk purchase was elicited using a ranking task, where respondents had to choose and rank the six most important purchase cirteria for milk out of a total of 12 criteria. Importantly, this ranking task took place before the provision of information about processing and before the choice experiment.

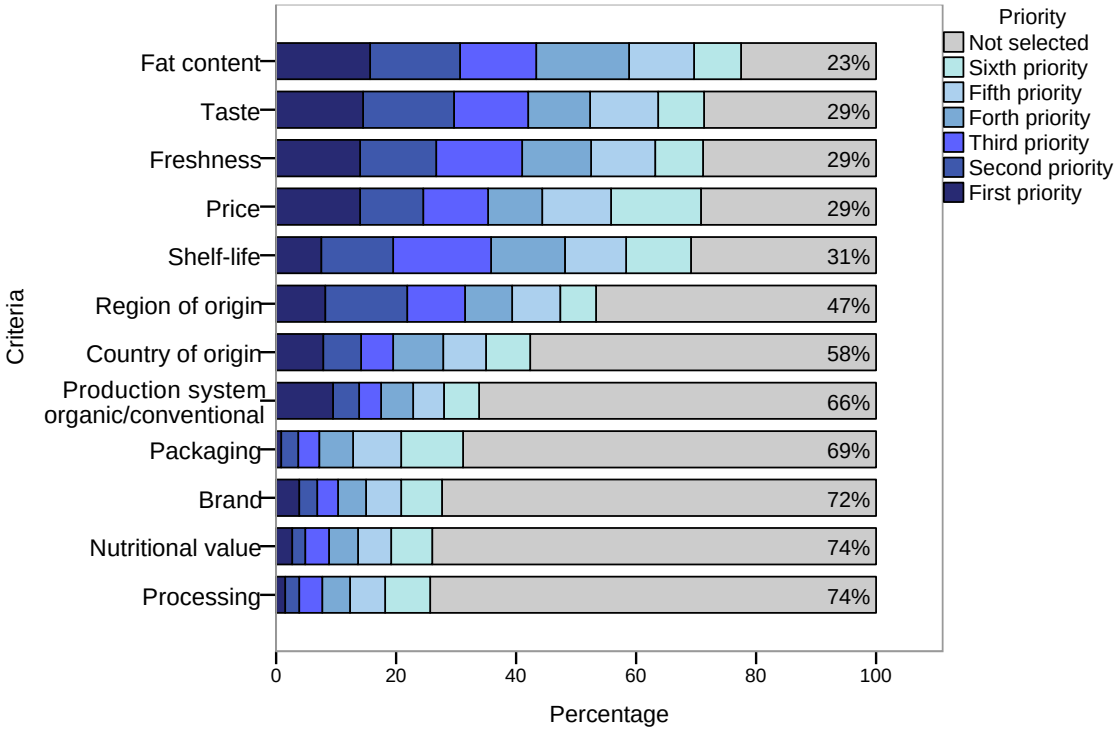

Figure 10 and Figure 11 show which criteria Swiss and German respondents considered as most important when buying milk.

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

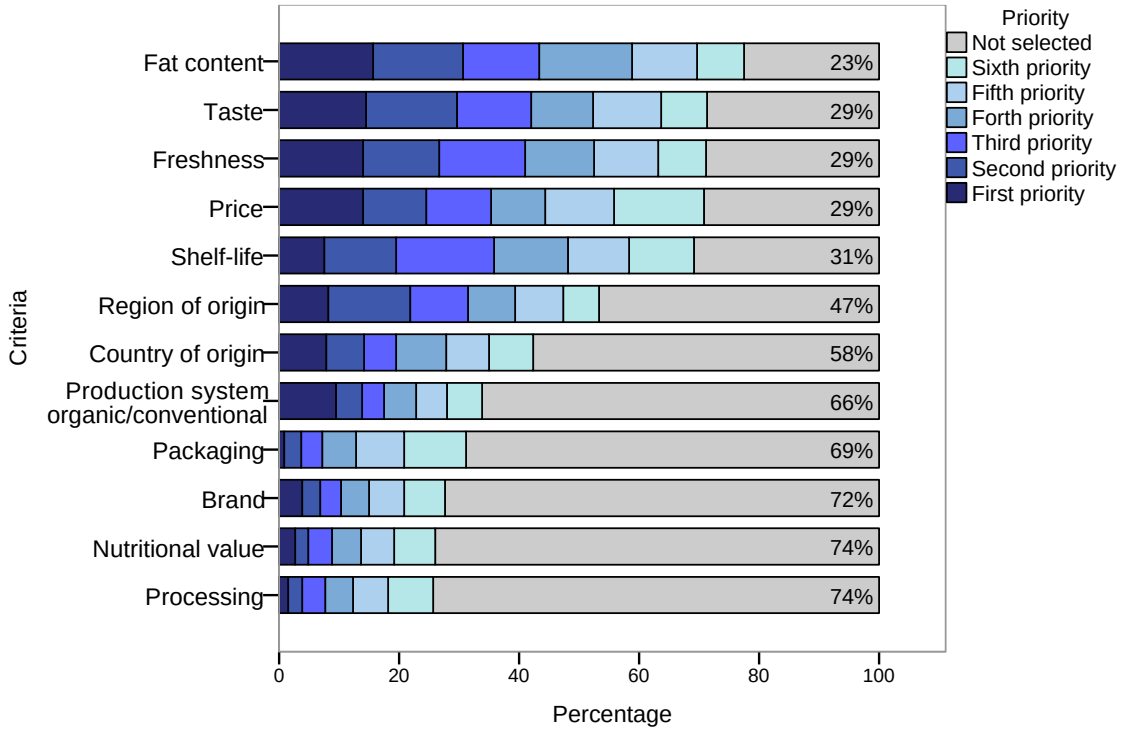

Figure 10: The importance of various criteria for milk purchase (F100) to German respondents [n = 600].

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

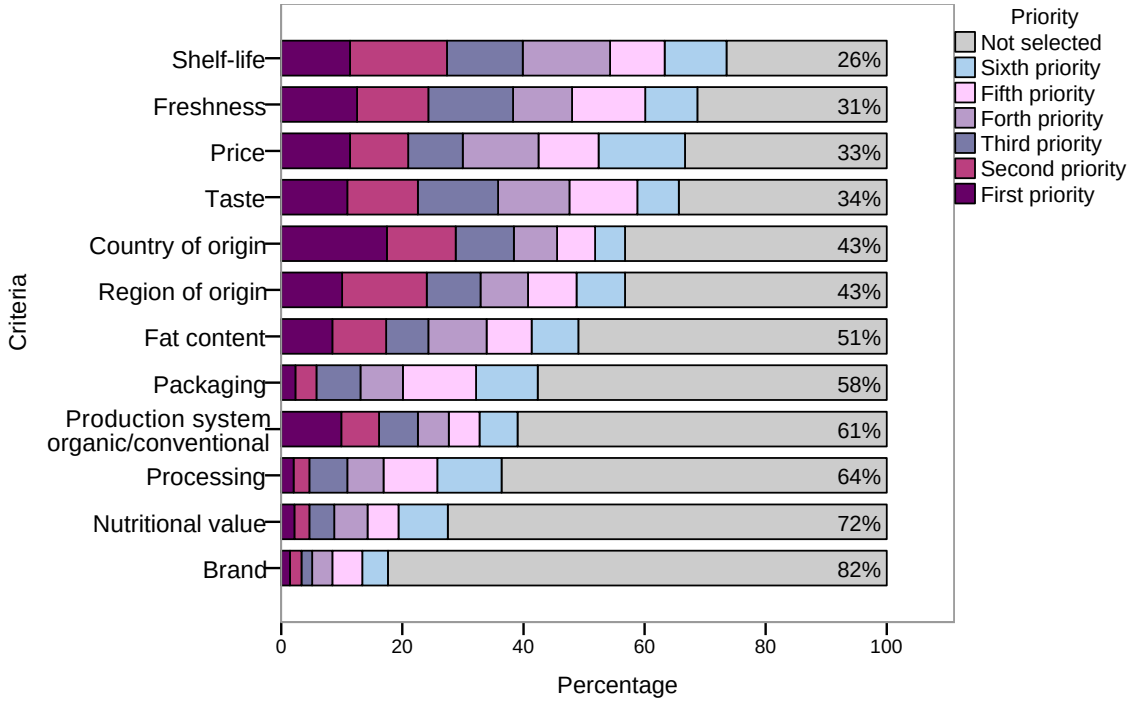

Figure 11: The importance of various criteria for milk purchase (F100) to Swiss respondents [n = 687].

In both countries, taste, freshness, price, shelf life, and region of origin were among the six most selected criteria for milk purchase. In the German sample, fat content, taste, freshness, price, shelf-life, and region of origin were the six most selected criteria. In Switzerland, these were shelf-life, freshness, price, taste, country of origin, and region of origin. Whereas fat content took the first position in the German sample, it was not among the six most selected criteria in the Swiss sample. Shelf life was on the first position in the Swiss sample, but only on the fifth position in the German sample.

In both samples, processing was of relatively low importance to respondents, but significantly more important in Switzerland. In the German sample, processing was least selected among all respondents. In the Swiss sample, processing was on the third-last position, before nutritional value and brand. Only 26% of German and 36% of Swiss respondents selected the criteria processing as one of the most important six criteria for milk purchase. However, some of the most selected criteria are highly dependent on the processing method, including fat conent, shelf-life, taste and freshness.

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 14 shows the importance of product attributes by organic consumer groups.

The results show that the milk choice behaviour significantly differs between organic consumer groups, except for the attributes brand, freshness, and nutritional value. The largest differences were found for the attributes production system, regional origin, and price. Whereas the importance of the attributes production system and regional origin were found to increase with increasing organic purchase frequency, the importance of the attribute price was found to decrease with increasing organic purchase frequency. Smaller but still substantial differences were found for the attributes taste, shelf life, packaging, and fat content, for which the importance was found to decrease with increasing organic purchase frequency. Even smaller but still significant differences were found for the attributes country of origin and processing, for which the importance was found to increase with increasing organic purchase frequency.

For the average heavy organic consumer the following six attributes are most important, in order of relevance: production system, freshness, region of origin, country of origin, taste, and shelf life. For the average occasional organic consumer these are: Freshness, shelf life, taste, price, fat content, and region of origin. For the average light organic consumer these are: price, shelf life, taste, fat content, freshness, and packaging.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 14: Importance of milk product attributes by organic consumer groups (F100).

Statements:		%zero[1]	p-value[2]
F100_1: Price	OC1 [421]	12	0.000
	OC2 [614]	35	
	OC3 [252]	55	
F100_2: Production system (organic vs. not organic)	OC1 [421]	89	0.000
	OC2 [614]	61	
	OC3 [252]	27	
F100_3: Region of origin	OC1 [421]	61	0.000
	OC2 [614]	40	
	OC3 [252]	29	
F100_4: Fat content	OC1 [421]	31	0.011
	OC2 [614]	37	
	OC3 [252]	50	
F100_5: Processing	OC1 [421]	71	0.029
	OC2 [614]	70	
	OC3 [252]	61	
F100_6: Brand	OC1 [421]	77	0.749
	OC2 [614]	78	
	OC3 [252]	79	
F100_7: Shelf life	OC1 [421]	14	0.000

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

	OC2 [614]	30	
	OC3 [252]	48	
F100_8: Packaging	OC1 [421]	52	
	OC2 [614]	65	0.041
	OC3 [252]	65	
F100_9: Taste	OC1 [421]	22	
	OC2 [614]	33	0.000
	OC3 [252]	45	
F100_10: Freshness	OC1 [421]	32	
	OC2 [614]	30	0.242
	OC3 [252]	27	
F100_11: Country of origin	OC1 [421]	57	
	OC2 [614]	48	0.025
	OC3 [252]	42	
F100_12: Nutritional value	OC1 [421]	76	
	OC2 [614]	71	0.599
	OC3 [252]	73	

[1]Percentage of respondents who did not choose the attribute as one of the six most important ones. The higher the share, the less important an attribute was.
[2]p-value is based on Kruskal Wallis test. Corresponding mean values and standard deviations are not shown here.

5.2.3.2 Choice experiment

The following section provides an overview on the results of the consumer choice experiment on milk processing methods. Latent class models were estimated separately for each country and treatment group, whereas treatment group 1 refers to consumers who received general information about the processing methods only, and treatment group 2 to those consumers, who received additional information on the influence of a specific processing method on taste, vitamins and minerals contents before starting the

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

choice experiment. The parameter estimates for the product-related variables, namely milk preserving processing methods 'pasteurisation' (PAST), 'micro filtration & pasteurisation' (MF) and 'high pressure processing' (HPP), together with the estimates for 'homogenisation' (homogen), 'geographic origin (regional)', 'production system' (organic) and 'price' are shown in The latent class models revealed that in each of the two study countries, there is a segment 1 consisting of consumers, who preferred organic milk in the choice experiment, regardless whether they belong to treatment group 1 or 2. These consumers significantly more frequently consume organic products in their everyday life as compared consumers belonging to segment 2, except in Switzerland, treatment group 2. Furthermore, they significantly more preferred HPP milk and significantly less preferred MP milk as compared to pasteurised milk. In addition, consumers in this segment significantly more preferred regional milk in the choice experiment than consumers in segment 2. In Germany, consumers in segment 1 significantly less consume UHT milk in their everyday life, and in treatment group 2, they significantly more consume pasteurised milk in their everyday life. The latter also applies to consumers in segment 1 in Switzerland, treatment group 1. Finally, consumers in segment 1 are price sensitive: the higher the price, the less likely consumers are to choose a milk alternative.

In contrast, consumers in segment 2 show a relatively low everyday life organic food consumption. Accordingly, they chose non-organic milk over organic milk in the choice experiment. In Germany, these consumers preferred MP milk in the choice experiment, whereas, similar to consumers in segment 1, they chose HPP milk over pasteurised milk in both countries. Other than expected, consumers in segment 2 behaved less price sensitive in the choice experiment than those in segment 1. This result is surprising given that according to previous research, organic consumers usually accept higher product prices than non-organic consumers and are less price-sensitive, which is contrary to the pattern we observed in the choice experiment. However, making choices in an experimental setting is a complex task and it may happen that consumers simply ignore single attributes when making their choices (in the literature referred to as attribute non-attendance). This also might have applied to consumers in segment 2. Besides, despite the relative large span between the single price levels used in the choice experiment (reaching from the average conventional milk price level up to a premium price that was 50 % higher than that average conventional milk price), the absolute product price levels were still relatively small. Accordingly, the product price might have played a relative small role in the choice experiment for some of the consumers.

The share of consumers belonging to segment 1 and 2 is about equal in treatment group 1, whereas in treatment group 2, the share of consumers belonging to segment 1 is considerably higher (about 75%) as compared to segment 1 (about 25%) (see Table 15). In Switzerland, the share of consumers belonging to segment 1 is slightly smaller (about

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

43 %) than those belonging to treatment group 2 (about 57 %) in terms of treatment group 1, whereas, same as in Germany, there is significant a shift towards segment 1 (77 %) in treatment group 2.

The parameter estimated for homogenisation is non-significant in all models. Obviously, this attribute played only a minor role when choosing a specific milk type.

The overall model fit, as indicated by the McFaddens Adjusted R2, ranging from 0.11 to 0.15, is relatively low. These values show that the portion of predicted behaviour is relatively small as compared to the much larger portion of random behaviour.

. In the latent class analysis, 'pasteurisation' was defined as base category of the three milk preserving processing methods and thus, the estimates for MF and HPP refer to this category. In addition to these product-specific variables, the consumer variables "organic consumption" (frequency in everyday life) and milk type preferred in everyday life (portion of consumed UHT and past milk in percent) were included in the models.

Table 15 Consumer segmentation according to organic food consumption and milk consumption preferences and habits in Germany and Switzerland

	Germany				Switzerland			
	Segment 1		Segment 2		Segment 1		Segment 2	
	TM 1	TM 2	TM 1	TM 2	TM 1	TM 2	TM 1	TM 2
Price	-1.01***	0.12	-0.41***	-0.22	-0.79***	0.01	-0.49***	-0.70***
Organic	0.91***	-0.57***	0.51***	-0.32***	1.06***	-0.39***	0.51***	-0.31***
MF	-0.22**	0.17*	-0.11**	0.33***	-0.26**	0.01	-0.07	0.15
HPP	0.30***	0.90***	0.18***	0.78***	0.49***	0.68***	0.27***	0.58***
Homogen	0.05	-0.09	-0.004	0.09	0.05	-0.03	-0.01	0.07
Regional	0.51***	-0.97***	-0.12*	-0.67***	0.55***	-0.89***	-0.03	-0.69***
Organic consumption	1.21***	-	2.02***	-	1.28***	-	3.29	-
UHT	-0.013***	-	-0.05***	-	0.002	-	-0.06	-

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Pastmilk	0.20	-	0.83***	-	0.01***	-	1.86	-
Class membership	0.504	0.496	0.756	0.244	0.427	0.573	0.768	0.232
Adj. R2	0.15		0.13		0.15		0.11	
Obs	5916		5916		5634		5682	

***, **, * ==> Significance at 1%, 5%, 10% level.
- = baseline; in all models, the values estimated for organic consumption, UHT and pastmilk in segment 1 refer to segment 2, respectively, while t he later serves as baseline for segment 1

The latent class models revealed that in each of the two study countries, there is a segment 1 consisting of consumers, who preferred organic milk in the choice experiment, regardless whether they belong to treatment group 1 or 2. These consumers significantly more frequently consume organic products in their everyday life as compared consumers belonging to segment 2, except in Switzerland, treatment group 2. Furthermore, they significantly more preferred HPP milk and significantly less preferred MP milk as compared to pasteurised milk. In addition, consumers in this segment significantly more preferred regional milk in the choice experiment than consumers in segment 2. In Germany, consumers in segment 1 significantly less consume UHT milk in their everyday life, and in treatment group 2, they significantly more consume pasteurised milk in their everyday life. The latter also applies to consumers in segment 1 in Switzerland, treatment group 1. Finally, consumers in segment 1 are price sensitive: the higher the price, the less likely consumers are to choose a milk alternative.

In contrast, consumers in segment 2 show a relatively low everyday life organic food consumption. Accordingly, they chose non-organic milk over organic milk in the choice experiment. In Germany, these consumers preferred MP milk in the choice experiment, whereas, similar to consumers in segment 1, they chose HPP milk over pasteurised milk in both countries. Other than expected, consumers in segment 2 behaved less price sensitive in the choice experiment than those in segment 1. This result is surprising given that according to previous research, organic consumers usually accept higher product prices than non-organic consumers and are less price-sensitive, which is contrary to the pattern we observed in the choice experiment. However, making choices in an experimental setting is a complex task and it may happen that consumers simply ignore single attributes when making their choices (in the literature referred to as attribute non-attendance). This also might have applied to consumers in segment 2. Besides, despite the relative large span between the single price levels used in the choice experiment (reaching from the average conventional milk price level up to a premium price that was

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

50 % higher than that average conventional milk price), the absolute product price levels were still relatively small. Accordingly, the product price might have played a relative small role in the choice experiment for some of the consumers.

The share of consumers belonging to segment 1 and 2 is about equal in treatment group 1, whereas in treatment group 2, the share of consumers belonging to segment 1 is considerably higher (about 75%) as compared to segment 1 (about 25%) (see Table 15). In Switzerland, the share of consumers belonging to segment 1 is slightly smaller (about 43 %) than those belonging to treatment group 2 (about 57 %) in terms of treatment group 1, whereas, same as in Germany, there is significant a shift towards segment 1 (77 %) in treatment group 2.

The parameter estimated for homogenisation is non-significant in all models. Obviously, this attribute played only a minor role when choosing a specific milk type.

The overall model fit, as indicated by the McFaddens Adjusted R2, ranging from 0.11 to 0.15, is relatively low. These values show that the portion of predicted behaviour is relatively small as compared to the much larger portion of random behaviour.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

5.2.3.3 Compilation of favourite milk and maximum willingness to pay for total sample and by treatment group

After the choice experiment consumers were asked to compile their favourite milk based on the same attributes used in the choice experiment and to indicate their maximum willingness to pay for it. Figure 12 shows the preferred milk processing method by treatment group for each country individually.

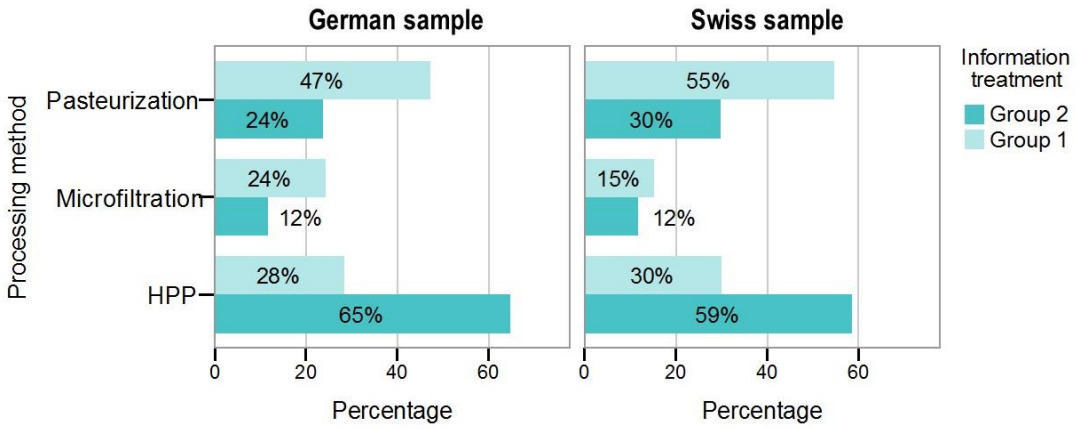

Figure 12: Preferred milk processing method by country and treatment group. German sample: treatment group 1 [n = 300], treatment group 2 [n = 300]; Swiss sample: treatment group 1 [n = 347], treatment group 2 [n = 340] (question F300).

In both country samples, participants of treatment group 1 clearly preferred pasteurization to micro filtration & pasteurisation and high pressure processing. In contrast, in treatment group 2, both German and Swiss respondents clearly preferred high pressure processing to pasteurization and micro filtration & pasteurisation. Hence, the additional information on processing-related impacts on vitamins, minerals, and taste led to a significant change in preferences in favour of high pressure processing, the method with the smallest impacts.

Even though in treatment group 1 both the German and Swiss respondents had a strong preference for pasteurization, German respondents' preference for pasteurization was a little less strong than Swiss respondents' preference for pasteurization. The opposite held for micro filtration & pasteurisation, for which German respondents' preference was stronger than Swiss respondents' preference. In treatment group 2 no differences were found between countries.

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 16 shows respondents' preferred milk processing method by treatment and organic consumer group.

Table 16: Preferred milk processing method by treatment and organic consumer group (F300).

Statements:			n	Mean
F300_1: Pasteurization	T1 [647]	OC1 [219]	117	0.53
		OC2 [307]	148	0.48
		OC3 [121]	67	0.55
	T2 [640]	OC1 [202]	57	0.28
		OC2 [307]	80	0.26
		OC3 [131]	35	0.27
F300_2: Microfiltration	T1 [647]	OC1 [219]	38	0.17
		OC2 [307]	60	0.20
		OC3 [121]	28	0.23
	T2 [640]	OC1 [202]	17	0.08
		OC2 [307]	32	0.10
		OC3 [131]	26	0.20
F300_3: High pressure processing	T1 [647]	OC1 [219]	64	0.29
		OC2 [307]	99	0.32
		OC3 [121]	26	0.21
	T2 [640]	OC1 [202]	128	0.63
		OC2 [307]	195	0.64

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

		OC3 [131]	70	0.53

Whereas the significant shift in preferences in favour of high pressure processing can also be observed for the three organic consumer groups, heavy organic consumers' reaction to the information treatment differs from the reaction of occasional and light organic consumers. First of all, in treatment group 1 and 2 heavy organic consumers' preference for HPP was found to be significantly less strong. In addition, in treatment group 2 their preference was found to be significantly stronger for micro filtration.

Table 17 through table 20 show the influence of product attributes on maximum willingness to pay by country and treatment group.

Table 17: Influence of product attributes on maximum willingness to pay for Germany, treatment group 1.

Variable	Coefficient	Lower bound (2.5%)	Upper bound (97.5%)	Std. error	p-value
Processing_micro	0.03	-0.08	0.14	0.06	0.604
Processing_hpp	0.10	-0.01	0.21	0.06	0.080
ProdSys_conv	-0.28	-0.38	-0.18	0.05	0.000
Origin_reg	0.21	0.09	0.33	0.06	0.001
Homogen_yes	-0.06	-0.16	0.03	0.05	0.186
Constant	1.25	1.11	1.40	0.07	0.000
Adjusted R^2	0.18				
n	300				

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 18: Influence of product attributes on maximum willingness to pay for Germany, treatment group 2.

Variable	Coefficient	Lower bound (2.5%)	Upper bound (97.5%)	Std. error	p-value
Processing_micro	0.13	-0.02	0.28	0.07	0.085
Processing_hpp	0.10	0.00	0.20	0.05	0.047
ProdSys_conv	-0.30	-0.38	-0.22	0.04	0.000
Origin_reg	0.08	-0.03	0.18	0.05	0.149
Homogen_yes	-0.02	-0.10	0.06	0.04	0.673
Constant	1.37	1.24	1.50	0.07	0.000
Adjusted R^2	0.18				
n	300				

Table 19: Influence of product attributes on maximum willingness to pay for Switzerland, treatment group 1.

Variable	Coefficient	Lower bound (2.5%)	Upper bound (97.5%)	Std. error	p-value
Processing_micro	0.04	-0.10	0.19	0.07	0.575
Processing_hpp	-0.02	-0.13	0.10	0.06	0.760
ProdSys_conv	-0.23	-0.34	-0.13	0.06	0.000
Origin_reg	0.19	0.08	0.31	0.06	0.001
Homogen_yes	-0.01	-0.12	0.09	0.05	0.842
Constant	1.89	1.75	2.03	0.07	0.000
Adjusted R^2	0.11				

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

n	347				

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 20: Influence of product attributes on maximum willingness to pay for Switzerland, treatment group 2.

Variable	Coefficient	Lower bound (2.5%)	Upper bound (97.5%)	Std. error	p-value
Processing_micro	0.09	-0.08	0.25	0.09	0.321
Processing_hpp	0.11	0.00	0.22	0.06	0.049
ProdSys_conv	-0.21	-0.32	-0.11	0.05	0.000
Origin_reg	0.15	0.04	0.26	0.05	0.007
Homogen_yes	-0.06	-0.16	0.04	0.05	0.213
Constant	1.85	1.71	2.0	0.07	0.000
Adjusted R^2	0.09				
n	340				

German respondents' maximum willingness to pay for 1 litre of milk was on average EUR 1.25 and EUR 1.37 in treatment group 1 and 2, respectively. Swiss respondents' maximum willingness to pay was CHF 1.89 and CHF 1.85 in treatment group 1 and 2, respectively.

In both countries, the product attribute processing only had a significant effect on the maximum willingness to pay of respondents in treatment group 2 but not in treatment group 1. In treatment group 2, the maximum willingness to pay was significantly higher for high pressure processing than for pasteurization. However, for high pressure processing versus micro filtration or micro filtration versus pasteurization, no significant differences were found.

The product attribute production system significantly influenced the maximum willingness to pay in both treatment groups of both country samples. Thus, respondents were willing to pay more for organic milk than for conventional milk. The product attribute "origin" also had a significant effect, except for treatment group 2 in the

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

German sample. The product attribute homogenization had no significant impact on respondents' willingness to pay, neither in treatment group 1 nor 2, in both country samples.

Respondents were additionally asked about the reason for their preferred choice of milk processing method. Respondents' mentionings were coded and are listed in Table 21 for pasteurization,

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 22 for micro filtration, and

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 23 for high pressure processing, always by country and treatment group.

Table 21: Reasons for preferred milk processing method: Pasteurization (F310).

Mentionings		n	Mean	Missings
Maintenance of taste: Maintaining/ little/ no large loss/ change in taste	DE [136]	28	0.21	77
	CH [216]	28	0.13	75
	T1 [244]	35	0.14	88
	T2 [108]	21	0.19	64
Maintenance of nutrients: Maintaining/ little/ no large loss/ change in (important/ relevant/ valuable) nutrients/ vitamins/ minerals/ other components	DE [136]	4	0.03	77
	CH [216]	7	0.03	75
	T1 [244]	5	0.02	88
	T2 [108]	6	0.06	64
Maintenance of quality: Maintaining/ little loss/ change in quality (includes maintenance of taste and nutrients)	DE [136]	32	0.24	77
	CH [216]	39	0.18	75
	T1 [244]	43	0.18	88
	T2 [108]	28	0.26	64
Shelf life: Long/ extended shelf life; enough/ appropriate shelf life	DE [136]	29	0.21	77
	CH [216]	34	0.16	75
	T1 [244]	45	0.18	88
	T2 [108]	18	0.17	64

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Careful: more/ most careful method	DE [136]	7	0.05	77
	CH [216]	8	0.04	75
	T1 [244]	9	0.04	88
	T2 [108]	6	0.06	64
Maintenance of naturalness: Maintaining original/ natural/ raw quality/ state; authentic	DE [136]	3	0.02	77
	CH [216]	13	0.06	75
	T1 [244]	13	0.05	88
	T2 [108]	3	0.03	64
Familiar: used to/ always buying this milk; milk is known	DE [136]	50	0.37	77
	CH [216]	91	0.42	75
	T1 [244]	102	0.42	88
	T2 [108]	39	0.36	64
Safety: well established/ safe/ trustworthy	DE [136]	21	0.15	77
	CH [216]	22	0.10	75
	T1 [244]	26	0.11	88
	T2 [108]	17	0.16	64
Simplicity/ Efficiency/ Effectiveness[1]: Little processing (steps); simple; little effort; little energy; efficient; effective	DE [136]	16	0.12	77
	CH [216]	25	0.12	75
	T1 [244]	34	0.14	88

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

	T2 [108]	7	0.06	64

[1]The codes simplicity and efficiency/ effectiveness were merged, as the latter category contained less than 50 mentionings overall.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 22: Reasons for preferred milk processing method: Microfiltration (F310).

Mentionings		n	Mean	Missings
Maintenance of taste: Maintaining/ little/ no large loss/ change in taste	DE [64]	8	0.13	44
	CH [60]	12	0.20	33
	T1 [80]	8	0.10	46
	T2 [44]	12	0.27	31
Maintenance of nutrients: Maintaining/ little/ no large loss/ change in (important/ relevant/ valuable) nutrients/ vitamins/ minerals/ other components	DE [64]	4	0.06	44
	CH [60]	4	0.07	33
	T1 [80]	3	0.04	46
	T2 [44]	5	0.11	31
Maintenance of quality: Maintaining/ little loss/ change in quality (includes maintenance of taste and maintenance of nutrients)	DE [64]	15	0.23	44
	CH [60]	15	0.25	33
	T1 [80]	13	0.16	46
	T2 [44]	17	0.39	31
Shelf life: Long/ extended shelf life; enough/ appropriate shelf life	DE [64]	16	0.25	44
	CH [60]	24	0.40	33
	T1 [80]	30	0.38	46
	T2 [44]	10	0.23	31
Careful: more/ most careful method	DE [64]	5	0.08	44

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

	CH [60]	0	0.00	33
	T1 [80]	4	0.05	46
	T2 [44]	1	0.02	31
Maintenance of naturalness: Maintaining original/ natural/ raw quality/ state; authentic	DE [64]	2	0.03	44
	CH [60]	0	0.00	33
	T1 [80]	2	0.03	46
	T2 [44]	0	0.00	31
Familiar: used to/ always buying this milk; milk is known	DE [64]	7	0.11	44
	CH [60]	9	0.15	33
	T1 [80]	12	0.15	46
	T2 [44]	4	0.09	31
Safety: well established/ safe/ trustworthy	DE [64]	18	0.28	44
	CH [60]	15	0.25	33
	T1 [80]	29	0.36	46
	T2 [44]	4	0.09	31
Simplicity/ Efficiency/ Effectiveness[1]: Little processing (steps); simple; little effort; little energy; efficient; effective	DE [64]	4	0.06	44
	CH [60]	4	0.07	33
	T1 [80]	5	0.06	46
	T2 [44]	3	0.07	31

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

[1]The codes simplicity and efficiency/ effectiveness were merged, as the latter category contained less than 50 mentionings overall.

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 23: Reasons for preferred milk processing method: High pressure processing (F310).

Mentionings		n	Mean	Missings
Maintenance of taste: Maintaining/ little/ no large loss/ change in taste	DE [236]	62	0.26	43
	CH [266]	50	0.19	37
	T1 [152]	12	0.08	37
	T2 [350]	100	0.29	43
Maintenance of nutrients: Maintaining/ little/ no large loss/ change in (important/ relevant/ valuable) nutrients/ vitamins/ minerals/ other components	DE [236]	100	0.42	43
	CH [266]	122	0.46	37
	T1 [152]	14	0.09	37
	T2 [350]	208	0.59	43
Maintenance of quality: Maintaining/ little loss/ change in quality (includes maintenance of taste and nutrients)	DE [236]	161	0.68	43
	CH [266]	162	0.61	37
	T1 [152]	40	0.26	37
	T2 [350]	283	0.81	43
Shelf life: Long/ extended shelf life; enough/ appropriate shelf life	DE [236]	33	0.14	43
	CH [266]	66	0.25	37
	T1 [152]	39	0.26	37
	T2 [350]	60	0.17	43
Careful: more/ most careful method	DE [236]	18	0.08	43

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

	CH [266]	13	0.05	37
	T1 [152]	16	0.11	37
	T2 [350]	15	0.04	43
Maintenance of naturalness: Maintaining original/ natural/ raw quality/ state; authentic	DE [236]	15	0.06	43
	CH [266]	25	0.09	37
	T1 [152]	14	0.09	37
	T2 [350]	26	0.07	43
Familiar: used to/ always buying this milk; milk is known	DE [236]	4	0.02	43
	CH [266]	5	0.02	37
	T1 [152]	4	0.03	37
	T2 [350]	5	0.01	43
Safety: well established/ safe/ trustworthy	DE [236]	8	0.03	43
	CH [266]	10	0.04	37
	T1 [152]	8	0.05	37
	T2 [350]	10	0.03	43
Simplicity/ Efficiency/ Effectiveness[1]: Little processing (steps); simple; little effort; little energy; efficient; effective	DE [236]	14	0.06	43
	CH [266]	21	0.08	37
	T1 [152]	25	0.16	37
	T2 [350]	10	0.03	43

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

[1]The codes simplicity and efficiency/ effectiveness were merged, as the latter category contained less than 50 mentionings overall.

For the choice of pasteurized milk, familiarity, maintenance of quality – particularly taste – and shelf life were the most important reasons. For the choice of microfiltrated (and pasteurized) milk, these were shelf life, safety, and maintenance of quality – specifically also with respect to taste. For the choice of HPP milk, maintenance of quality stood out as most important reason – particularly maintenance of nutrients, but also taste –, followed by shelf life.

Hence, shelf life was an important reason of choice for all three processed milk types, but it was most important in the case of microfiltrated (and pasteurized) milk. Also the maintenance of quality was important across all three processed milk types, but it was most important in the case of HPP milk, specifically due to an increase in importance of the maintenance of nutrients. Safety only played an important role in the case of microfiltrated (and pasteurized) milk, and familiarity only in the case of pasteurized milk. The simplicity of the processing method played a subordinate role overall, but was more frequently mentioned in the case of pasteurization. Carefulness was only rarely mentioned as a reason of choice and with about the same frequency across all three processed milk types.

Overall, familiarity and shelf life were more frequently mentioned by Swiss respondents as well as respondents of treatment group 1. The maintenance of quality was more frequently mentioned by German respondents as well as participants of treatment group 2.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

5.3 Careful processing

5.3.1 Respondents‘ perceptions, expectations, and preferences with respect to careful processing

5.3.1.1 Respondents‘ perceptions about careful processing

To examine respondents‘ perceptions about careful processing, they were first asked to evaluate differently processed food products in terms of how carefully they perceived them to be processed. Importantly, for each product respondents had the possibility to access information about the processing method by clicking on an info button (see question F400 in the Appendix). Table 24 shows the results of this evaluation by country and treatment group.

Table 24: Respondents’ evaluation of processed food products with respect to “careful processing” (F400).

Statements:		Mean[1]	Std. dev. [1]	p-value	Non-resp.[2]
F400_1: Pasteurized milk is very carefully processed.	DE [540]	4.89	1.35	0.228	60
	CH [633]	4.97	1.39		54
	T1 [584]	5.16	1.34	0.000	63
	T2 [589]	4.71	1.37		51
F400_2: Microfiltrated and pasteurized milk is very carefully processed.	DE [531]	4.67	1.40	0.220	69
	CH [607]	4.57	1.44		80
	T1 [562]	4.65	1.43	0.303	85
	T2 [576]	4.57	1.41		64
F400_3: HPP milk is very carefully processed.	DE [538]	5.31	1.48	0.003	62
	CH [610]	5.06	1.48		77

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

	T1 [559]	4.85	1.49	0.000	88
	T2 [589]	5.48	1.41		51
F400_4: UHT milk is very carefully processed.	DE [552]	4.12	1.74	0.240	48
	CH [622]	4.00	1.74		65
	T1 [583]	4.20	1.70	0.004	64
	T2 [591]	3.92	1.78		49
F400_5: Cold extruded pasta is very carefully processed.	DE [377]	4.69	1.46	0.717	223
	CH [439]	4.67	1.32		248
	T1 [414]	4.67	1.41	0.863	233
	T2 [402]	4.68	1.36		238
F400_6: Hot extruded cereals are very carefully processed.	DE [375]	4.02	1.66	0.535	225
	CH [437]	3.96	1.54		250
	T1 [415]	3.99	1.62	0.883	232
	T2 [397]	3.99	1.57		243
F400_7: Fruit juice treated with PEF is very carefully processed.	DE [379]	4.49	1.58	0.052	221
	CH [457]	4.25	1.65		230
	T1 [416]	4.26	1.61	0.051	231
	T2 [420]	4.44	1.63		220
	DE [529]	4.67	1.40	0.596	71

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

F400_8: Homogenized milk is very carefully processed.	CH [598]	4.70	1.45		89
	T1 [555]	4.72	1.43	0.491	92
	T2 [572]	4.66	1.42		68

[1]Values are based on a 7-Point-Likert Scale: 1 'I fully disagree' to 7 'I fully agree'.
[2]Respondents who selected 'I don't know' were excluded from the calculations.

In the German sample, HPP milk (M = 5.31) was evaluated as most carefully processed, followed by pasteurized milk (M = 4.89), cold extruded pasta (M = 4.69), microfiltrated and pasteurized milk (M = 4.67), and homogenized milk (M = 4.67). Swiss respondents also considered HPP milk (M = 5,06) as most carefully processed, followed by pasteurized milk (M = 4.97), homogenized milk (M = 4.70), cold extruded pasta (M = 4.67), and microfiltrated and pasteurized milk (M = 4.57). Fruit juice treated with PEF (MDE = 4.49, MCH = 4.25), UHT milk (MDE = 4.12, MCH = 4.00), and hot extruded cereals (MDE = 4.02, MCH = 3.96) scored lowest in careful processing in both samples. Hence, the evaluation was very similar in both country samples. Although HPP milk was perceived significantly more carefully processed by the German than by the Swiss respondents, it was still considered the most carefully processed product in both samples.

Between treatment groups, the evaluation differed with respect to pasteurized milk, HPP milk, microfiltrated milk, and UHT milk. In treatment group 2, HPP milk was rated significantly higher than in treatment group 1 and pasteurized and UHT milk significantly lower. Thus, treatment group 2 perceived HPP milk (M = 5.48) as most carefully processed, followed by pasteurized milk (M = 4.71), and treatment group 1 perceived pasteurized milk (M = 5.16) as most carefully processed, followed by HPP milk (M = 4.85). Hence, the additional information on processing-related impacts on taste, vitamins, and minerals had a significant effect on treatment group 2's perception of the carefulness of milk processing methods.

For some product evaluations, a significant negative correlation with respondents' organic purchase frequency was found, but it was rather low (correlation coefficient below 0.2). No significant correlations were found between product evaluations and food technology neophobia statements.

It is important to note that the share of participants who rated the different processed food products was substantially higher for milk than for other processed food. Up to 12% of German and up to 13% of Swiss respondents selected 'I do not know' for pasteurized, microfiltrated and pasteurized, HPP, UHT, and homogenized milk. In contrast, 37% to 38% of German and 33% to 36% of Swiss respondents selected this option for cold

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

extruded pasta, hot extruded cereals, and fruit juice treated with PEF. These differences in ‚non-response' can partly be explained by the difference in the amount of information which was provided about the processing methods during the survey. Particularly, pasteurization, microfiltration, and high pressure processing were explained in detail in the first half of the questionnaire. In fact, in treatment group 2, who received additional information on the impacts of these three methods, the non-response is significantly lower than in treatment group 1. However, the differences in non-response between milk and other food products may also be partly attributable to the lower familiarity of respondents with the processing methods ‚extrusion' and ‚PEF' than for example with ‚UHT' for which the same amount of information was provided.

After the evaluation of the food products with respect to careful processing respondents were asked to describe what careful processing meant to them in an open question. Table 25 shows what respondents mentioned most frequently, by country and by treatment group.

Table 25: Respondents' understanding of the term careful processing (F410).

Mentionings		n	Mean	Missings
Maintenance of nutrients: Maintaining/ little/ no large loss/ change in (important/ relevant/ valuable) nutrients/ vitamins/ minerals/ other components; healthy	DE [470]	238	0.51	130
	CH [542]	246	0.45	145
	T1 [513]	198	0.39	134
	T2 [502]	286	0.57	138
Maintenance of taste: Maintaining/ little/ no large loss/ change in taste	DE [470]	63	0.13	130
	CH [542]	76	0.14	145
	T1 [513]	41	0.08	134
	T2 [502]	98	0.20	138
Maintenance of naturalness: Maintaining original/ natural quality/ state; using natural processing	DE [470]	139	0.30	130
	CH [542]	184	0.34	145

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

	T1 [513]	168	0.33	134
	T2 [502]	155	0.31	138
Low product stress: Little/ short/ processing (steps); simple; slow; no overprocessing; no unnessessary processing; no stress; minimal processing; No/ little/ short heating/ pressure/ cooling etc.	DE [470]	128	0.27	130
	CH [542]	140	0.26	145
	T1 [513]	159	0.31	134
	T2 [502]	109	0.22	138
Avoidance of additives: No/ little chemical/ artificial additives	DE [470]	23	0.05	130
	CH [542]	36	0.07	145
	T1 [513]	35	0.07	134
	T2 [502]	24	0.05	138
Safety: Safety/ controls/ shelf life/ hygiene	DE [470]	32	0.07	130
	CH [542]	50	0.09	145
	T1 [513]	54	0.11	134
	T2 [502]	28	0.06	138
Efficiency/ Effectiveness: Low environmental impact/ resource efficient/ effective/ low energy use	DE [470]	30	0.06	130
	CH [542]	57	0.11	145
	T1 [513]	47	0.09	134
	T2 [502]	40	0.08	138

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

On country level, respondents most frequently mentioned the maintenance of nutrients, the maintenance of naturalness, and low product stress, followed by maintenance of taste. Avoidance of chemical or artificial additives as well as efficiency/ effectiveness (low environmental impact/ resource efficiency/ low energy use) were mentioned less frequently. There were no large differences between countries, except for the comments on efficiency/ effectiveness which were made almost twice as often in the Swiss sample as in the German sample.

The number of comments on the maintenance of nutrients and taste were significantly higher in treatment group 2 than in treatment group 1. Hence, the additional information on processing-related impacts on taste, vitamins, and minerals had a significant effect on treatment group 2's perception of careful processing.

It is important to note, that these results are strongly related to the product milk. Even though the question was formulated for food in general, it is likely that most respondents answered it thinking of milk, as the first half of the questionnaire had a strong focus on milk. A total of about 90 respondents even mentioned milk in order to describe their understanding of careful processing.

Terms which were mentioned less than 50 times overall, are not listed in the table above. These include: maintenance of shape/ structure/ texture/ consistency/ colour (n=38); organic (n=7); processing is never careful (n=6).

Comments which were made on some kind of change, be it related to nutrients, taste, shape, or naturalness, were additionally evluated by the change intensity respondents described as careful. The results are shown in Table 26.

Table 26: Respondents' comments on 'change' by change intensity (F410 – only mentionings with respect to change).

Mentionings		n	Mean	Missings
No change	DE [470]	197	0.42	130
	CH [542]	175	0.32	145
	T1 [513]	179	0.35	134
	T2 [502]	193	0.38	138
Little change (as possible)	DE [470]	129	0.27	130

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

	CH [542]	160	0.30	145
	T1 [513]	112	0.22	134
	T2 [502]	177	0.35	138
No large/ strong/ extreme change	DE [470]	22	0.05	130
	CH [542]	40	0.07	145
	T1 [513]	31	0.06	134
	T2 [502]	31	0.06	138

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

These results suggest that respondents' expectations of careful processing are very high. For 30% to 40% of the respondents, careful processing meant no change at all:

- "The food remains in its original form, as it comes from the animal or the field."
- "If the food is natural and only the most necessary processing is done. To me, natural and unadulterated means gently processed – vitamins and ingredients are not decimated or destroyed."
- "No ingredients such as vitamins are lost."
- "Product is left in its original form."
- "Gentle processing means that raw milk is kept in its original state, but is extended in shelf life."

For 20% to 30% of the respondents, careful processing meant little or minimal change:

- "Raw product undergoes only minimal negative changes."
- "Minimal influence on taste and ingredients..."
- "Product remains as natural as possible in its entirety."
- "As few natural substances are destroyed as possible."

For 5% to 7% of the respondents, careful processing meant no strong or no extreme change:

- "Nothing extreme."
- "No extreme measures (very high pressure, very high temperature...) are applied."
- "No extreme interventions (partitioning/ splitting etc.)..."
- "The original food is not strongly changed by the processing."

To further examine their perceptions about careful processing, respondents were also asked to evaluate different statements about carefully processed food. Table 27 shows the results of this evaluation by country and treatment group.

Table 27: Respondents' evaluation of different statements about carefully processed food (F430).

Statements:	Country	Mean[1]	Std. dev.[1]	p-value	Non-resp.[2]
F430_1: Carefully processed food products are healthier.	DE [564]	5.67	1.30	0.102	36
	CH [644]	5.52	1.42		43

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

	T1 [602]	5.47	1.41	0.003	45
	T2 [606]	5.71	1.31		34
F430_2: Carefully processed food products have a better taste.	DE [559]	5.65	1.28	0.005	41
	CH [635]	5.42	1.38		52
	T1 [591]	5.42	1.34	0.002	56
	T2 [603]	5.64	1.33		37
F430_3: Carefully processed food products contain more valuable nutrients.	DE [568]	5.98	1.16	0.080	32
	CH [653]	5.82	1.33		34
	T1 [605]	5.77	1.29	0.001	42
	T2 [616]	6.01	1.21		24
F430_4: Carefully processed food products are more natural.	DE [568]	5.83	1.30	0.011	32
	CH [648]	5.63	1.41		39
	T1 [608]	5.66	1.41	0.192	39
	T2 [608]	5.79	1.30		32
F430_5: Carefully processed food products pollute the environment less.	DE [526]	5.24	1.41	0.034	74
	CH [601]	5.05	1.53		86
	T1 [576]	5.12	1.51	0.917	71
	T2 [551]	5.13	1.44		89
	DE [562]	5.64	1.32	0.017	38

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

F430_6: Carefully processed food products are more authentic.	CH [636]	5.39	1.43		51
	T1 [601]	5.47	1.48	0.568	46
	T2 [597]	5.55	1.37		43

[1]Values are based on a 7-Point-Likert Scale: 1 'I fully disagree' to 7 'I fully agree'.
[2]Respondents who selected 'I don't know' were excluded from the calculations.

Respondents agreed most that carefully processed food products contain more valuable nutrients (MDE = 5.98; MCH = 5.82), are more natural (MDE = 5.83; MCH = 5.63), are healthier (MDE = 5.67; MCH = 5.52), have a better taste (MDE = 5.65; MCH = 5.42), and are more authentic (MDE = 5.64; MCH = 5.39). The agreement for the statement "carefully processed food pollutes the environment less" (MDE = 5.24; MCH = 5.05) was lower but still rather high.

Mean values were generally higher in the German sample than in the Swiss sample, and significantly so for the statements on taste, naturalness, environmental polluation, and authenticity. Furthermore, the non-response was substantially higher for the statement 'carefully processed food products pollute the environment less' than for the other statements. Whereas 12% of German respondents and 13% of Swiss respondents selected 'I do not know' for the former, 5% to 7% of German and 5% to 8% of Swiss respondents chose this option for the latter.

Mean values were also generally higher for respondents of treatment group 2 than for respondents of treatment group 1. However, they were only significantly higher for the statements on health, taste, and nutrients.

In both samples, the agreement with these six statements was found to increase with increasing organic purchase frequency. In Germany, correlation coefficients ranged between 0.12 and 0.20. In Switzerland, correlation coefficients ranged between 0.16 and 0.21. The statement with the highest correlation coefficient was „…are healthier" in Switzerland, and „…are more authentic" in Germany.

5.3.1.2 Respondents' expectations and preferences with respect to careful processing

To examine respondents' expectations and preferences with respect to careful processing, they were asked (1) to state to what extent processing-related impacts would be accepted for carefully processed food, (2) to indicate the importance they attributed to carefully processed food and their willingness to pay more for it,and (3) to give their opinion on processing-related on-product information, shelf life, and packaging.

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 28 shows the results for participants' acceptance with respect to processing-related impacts for carefully processed food. Results are shown by country and treatment group.

Table 28: Respondents' acceptance with respect to processing-related impacts for carefully processed foods (F440).

Impacts	Country	Mean[1]	Std. dev.[1]	p-value	Non-resp.[2]	Missings[3]
F440_1: Taste	DE [527]	5.88	1.05	0.057	34	39
	CH [577]	5.75	1.10		37	73
	T1 [549]	5.84	1.08	0.342	41	57
	T2 [555]	5.78	1.08		30	55
F440_2: Vitamins	DE [527]	5.90	0.95	0.119	34	39
	CH [591]	5.78	1.05		23	73
	T1 [554]	5.80	1.03	0.405	36	57
	T2 [564]	5.87	0.98		21	55
F440_3: Minerals	DE [525]	5.86	0.94	0.230	36	39
	CH [577]	5.76	1.05		37	73
	T1 [543]	5.81	1.00	0.988	47	57
	T2 [559]	5.81	1.00		26	55
F440_4: Environment	DE [507]	5.60	1.00	0.032	54	39
	CH [561]	5.47	1.04		53	73
	T1 [532]	5.52	0.99	0.487	58	57
	T2 [536]	5.55	1.05		49	55

[1]For F440_1 through F440_3, values are based on a 7-Point-Likert Scale: 1 'Total change/loss' to 7 'No change/loss'. For F440_4 values are based on a 6-Point-Likert Scale: 2 'Very large impact' to 7 'No impact'.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

[2]Respondents who selected 99 'I do not know' or 77 'not relevant' were excluded from the calculations.
[3]Only respondents who considered careful processing as rather important for their food purchase (F420_1 ≥ 4) received this question.

Respondents seemed to accept only minimal impacts on taste, vitamins, minerals, and the environment when it comes to carefully processed foods. Furthermore, for taste, vitamins, and minerals expectations were higher than for the environment. Also the response rate was higher for the latter three dimensions than for the dimension ‚environment'.

Except for respondents' expectations with respect to environmental impacts, which were significantly higher in Germany, there were no significant differences between country samples. Also between treatment groups, no significant differences were found, apart from the response rate, which was significantly higher for the dimensions taste, vitamins, and minerals in treatment group 2 than in treatment group 1. The correlations with organic purchase frequency were insignificant.

Table 29 shows the importance respondents attributed to carefully processed food and their willingness to pay more for carefully processed food.

Table 29: Importance and willingness to pay more for carefully processed food (F420).

Statements:	Country	Mean[1]	Std. dev. [1]	p-value	Non-resp.[2]
F420_1: For me it is very important that a food product is as carefully processed as possible.	DE [586]	5.70	1.35	0.195	14
	CH [669]	5.59	1.40		18
	T1 [629]	5.67	1.38	0.377	18
	T2 [626]	5.61	1.37		14
F420_2: I am absolutely willing to pay more for carefully processed food products.	DE [584]	5.11	1.63	0.002	16
	CH [673]	4.82	1.67		14
	T1 [630]	4.93	1.66	0.463	10
	T2 [627]	4.98	1.64		13

[1]Values are based on a 7-Point-Likert Scale: 1 'I fully disagree' to 7 'I fully agree'.

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

[2]Respondents who selected 'I don't know' were excluded from the calculations.

The results show that careful processing was considered very important by the respondents of both samples and treatment groups and that they would be willing to pay more for carefully processed products, particularly in Germany.

Furthermore, both importance and willingness to pay for carefully processed products was found to increase with increasing organic purchase frequency. With a coefficient of 0.29 in Germany and 0.24 in Switzerland, the correlation for the importance of careful processing was quite large. Also the correlation for willingness to pay for more carefully processed food was quite large, with a coefficient of 0.45 in Germany and 0.41 in Switzerland.

Table 30 shows respondents' opinions on on-product information, shelf-life, and packaging by country.

Table 30: Respondents' opinions on on-product information, shelf-life, and packaging (F450).

Statements:	Country	Mean[1]	Std. dev. [1]	p-value	Non-resp.[2]
F450_1: For me it is very important, that the way a product was processed is indicated on the packaging.	DE [587]	5.83	1.33	0.002	13
	CH [682]	5.56	1.51		5
F450_2: For me it is very important that the shelf-life of a product is as long as possible.	DE [592]	4.51	1.82	0.000	8
	CH [683]	4.89	1.68		4
F450_3: For me it is very important that a food product's packaging is as environmentally friendly as possible.	DE [587]	5.83	1.36	0.937	13
	CH [682]	5.81	1.42		5

[1]Values are based on a 7-Point-Likert Scale: 1 'I fully disagree' to 7 'I fully agree'.
[2]Respondents who selected 'I don't know' were excluded from the calculations.

The agreement on the availability of processing-related on-product information and the use of envrionmentally friendly packaging was very high, both in the German and the Swiss sample. The agreement on extended shelf-life was significantly lower in both countries, but still above the central point of the likert scale.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

The agreement on the availability of processing-related on-product information was significantly higher in Germany, and the agreement on extended shelf-life was significantly higher in Switzerland.

Organic purchase frequency was found to significantly correlate with all three statements, in both samples. The agreement with the statement on on-product information and the agreement with the statement on environmentally friendly packaging were both found to increase with increasing organic purchase frequency. In contrast, the agreement with the statement on extended shelf life was found to decrease with increasing organic purchase frequency. Except for one coefficient, all correlation coefficients were above |0.2|.

5.4 Organic processing

5.4.1 Respondents' perceptions, expectations, and preferences with respect to the processing of organic food

5.4.1.1 Respondents' perceptions about the processing of organic food

To examine respondents' perceptions about the processing of organic food, respondents were asked to do a similar evaluation as they had done for careful processing. This time they were asked to indicate which processing methods they considered suitable for the processing of organic food. The methods evaluated were the same as for careful processing. Again, respondents had the possibility to access information about the processing method by clicking on an info button. Table 31 shows the results of this evaluation by country. The results for pasteurization, microfiltration, and HPP are again additionally shown by treatment group.

Table 31: Respondents' perceptions about the suitability of selected processing methods for organic food (F530).

Method:	Country	Mean[1]	Std. dev.[1]	p-value	Non-resp.[2]	Missings[3]
F530_1: Pasteurization	DE [435]	4.96	1.55	0.421	97	68
	CH [530]	5.06	1.49		120	37
	T1 [470]	5.22	1.47	0.000	119	58
	T2 [495]	4.82	1.53		98	47

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

F530_2: Microfiltration (in combination with pasteurization)	DE [416]	4.76	1.55	0.589	116	68
	CH [503]	4.72	1.57		147	37
	T1 [441]	4.78	1.56	0.634	148	58
	T2 [478]	4.71	1.57		115	47
F530_3: High pressure processing (HPP)	DE [432]	5.42	1.47	0.000	100	68
	CH [505]	5.01	1.61		145	37
	T1 [445]	5.09	1.51	0.009	144	58
	T2 [492]	5.30	1.60		101	47
F530_4: Ultra high temperature (UHT)	DE [426]	4.31	1.78	0.173	106	68
	CH [516]	4.14	1.82		134	37
	T1 [454]	4.33	1.80	0.102	135	58
	T2 [488]	4.12	1.81		105	47
F530_5: Cold extrusion	DE [366]	5.16	1.47	0.040	166	68
	CH [449]	4.98	1.45		201	37
	T1 [403]	5.06	1.44	0.670	186	58
	T2 [412]	5.06	1.49		181	47
F530_6: Hot extrusion	DE [372]	4.34	1.70	0.139	160	68
	CH [435]	4.20	1.60		215	37
	T1 [399]	4.32	1.66	0.436	190	58
	T2 [408]	4.21	1.63		185	47
	DE [375]	4.66	1.62	0.002	157	68

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

F530_7: Pulsed electric fields (PEF)	CH [445]	4.27	1.73		205	37
	T1 [401]	4.37	1.69	0.148	188	58
	T2 [419]	4.52	1.68		174	47
F530_8: Homogenization	DE [429]	4.79	1.62	0.262	103	68
	CH [500]	4.71	1.56		150	37
	T1 [450]	4.76	1.59	0.985	139	58
	T2 [479]	4.74	1.59		114	54

[1]Values are based on a 7-Point-Likert Scale: 1 'I fully disagree' to 7 'I fully agree'.
[2]Respondents who selected 'I don't know' were excluded from the calculations.
[3]Respondents who stated to never buy organic food in F500 were excluded from this question.

In the German sample, high pressure processing (M = 5.42) was considered most suitable for organic food, followed by cold extrusion (M = 5.16), pasteurization (M = 4.96), homogenization (M = 4.79), and microfiltration (M = 4.76). Swiss respondents considered pasteurization (M = 5.06) as most suitable for organic food, followed by high pressure processing (M = 5.01), cold extrusion (M = 4.98), microfiltration (M = 4.72), and homogenization (M = 4.71). Pulsed electric fields (PEF) still had a rather high score in the German sample (MDE = 4.66), but was, like in the Swiss sample (MCH = 4.27), among the technologies which scored lowest, together with hot extrusion (MDE = 4.34; MCH =4.20), and ultra high temperature (UHT) processing (MDE = 4.31; MCH = 4.14). Hence, the evaluation was very similar in both country samples, except for HPP, cold extrusion, and PEF, which German respondents considered to be significantly more suitable for the processing of organic food than Swiss respondents.

Between treatment groups, the evaluation differed with respect to pasteurization and HPP. In treatment group 2, HPP was rated significantly higher than in treatment group 1 and pasteurization significantly lower. Thus, treatment group 2 perceived HPP (M = 5.30) as most suitable for the processing of organic food, followed by pasteurization (M = 4.82), and treatment group 1 perceived pasteurization (M = 5.22) as most suitable, followed by HPP (M = 5.09).

For some product evaluations, a significant negative correlation with respondents' organic purchase frequency was found, but it was rather low (correlation coefficient < 0.2). No significant correlations were found between product evaluations and food technology neophobia statements.

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

These results are quite similar to the results obtained in the evaluation with respect to careful processing. The methods which were perceived as more careful, namely high pressure processing, pasteurization, cold extrusion, microfiltration, and homogenization, were also perceived as more suitable for the processing of organic food. Furthermore, treatment group 2, who perceived HPP as more careful and pasteurization as less careful than treatment gorup 1 also perceived HPP more suitable and pasteurization less suitable for the processing of organic food. However, mean values were generally higher in this evaluation. In both country samples, cold and hot extrusion were considered as significantly more suitable for the processing of organic food than they were considered careful.

As shown in

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 32, the methods which were most often considered unsuitable for the processing of organic food (rating below 4) were ultra high temperature (UHT), hot extrusion, and pulsed electric fields (PEF).

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Table 32: Share of respondents who rated a processing method with a value below 4 (F530).

Method:		n (value < 4)	Mean	Missings[1]
F530_1: Pasteurization	Total [965]	125	0.13	322
F530_2: Microfiltration (in combination with pasteurization)	Total [919]	160	0.17	368
F530_3: High pressure processing (HPP)	Total [937]	110	0.12	350
F530_4: Ultra high temperature (UHT)	Total [942]	290	0.31	345
F530_5: Cold extrusion	Total [815]	88	0.11	472
F530_6: Hot extrusion	Total [807]	225	0.28	480
F530_7: Pulsed electric fields (PEF)	Total [820]	203	0.25	467
F530_8: Homogenization	Total [929]	163	0.18	358

[1]Respondents who stated not to consume organic food in F500 and who stated ‚I don't know' in F530.

In an open question, respondents commented on the reasons why they considered a processing method to be unsuitable for organic processing, i.e. why they rated it with a value below 4. These comments were divided into eight categories. Table 33 shows to which categories respondents' comments most frequently related to.

Table 33: Reasons for a processing method's unsuitability for organic processing (F540).

Mentionings		n	Mean	Missings[1]
Loss in nutrients: Too much loss/ destruction of nutrients/ vitamins/ other components	PAST [125]	37	0.30	41
	MICRO [160]	30	0.19	45

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

	HPP [110]	11	0.10	39
	UHT [290]	84	0.29	51
	EXTR COLD [88]	11	0.13	29
	EXTR HOT [225]	47	0.21	57
	PEF [203]	22	0.11	57
	HOMO [163]	29	0.18	42
Loss in taste: too much loss/ destruction of taste	PAST [125]	10	0.08	41
	MICRO [160]	5	0.03	45
	HPP [110]	3	0.03	39
	UHT [290]	23	0.08	51
	EXTR COLD [88]	4	0.05	29
	EXTR HOT [225]	11	0.05	57
	PEF [203]	5	0.02	57
	HOMO [163]	9	0.06	42
Loss in naturalness: product is too far from original/ natural quality/ state; processing is not natural/ artificial/ industrial	PAST [125]	24	0.19	41
	MICRO [160]	39	0.24	45
	HPP [110]	24	0.22	39
	UHT [290]	63	0.22	51
	EXTR COLD [88]	24	0.27	29

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

	EXTR HOT [225]	47	0.21	57
	PEF [203]	46	0.23	57
	HOMO [163]	44	0.27	42
Loss in structure: molecular changes; structural changes; denaturation	PAST [125]	2	0.02	41
	MICRO [160]	2	0.01	45
	HPP [110]	1	0.01	39
	UHT [290]	7	0.02	51
	EXTR COLD [88]	0	0.00	29
	EXTR HOT [225]	6	0.03	57
	PEF [203]	8	0.04	57
	HOMO [163]	4	0.02	42
Product stress: too much stress/ intervention/ intensity/ heat/ change	PAST [125]	24	0.19	41
	MICRO [160]	55	0.34	45
	HPP [110]	32	0.29	39
	UHT [290]	97	0.33	51
	EXTR COLD [88]	20	0.23	29
	EXTR HOT [225]	74	0.33	57
	PEF [203]	52	0.26	57
	HOMO [163]	56	0.34	42

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Personal/ health risk: unsafe; uncommon; not known; not trusted/ not healthy	PAST [125]	2	0.02	41
	MICRO [160]	2	0.01	45
	HPP [110]	6	0.05	39
	UHT [290]	5	0.02	51
	EXTR COLD [88]	4	0.05	29
	EXTR HOT [225]	5	0.02	57
	PEF [203]	22	0.11	57
	HOMO [163]	2	0.01	42
Environmental stress: too much energy; pollution; not good/ careful for the environment; negative environmental impact	PAST [125]	7	0.06	41
	MICRO [160]	10	0.06	45
	HPP [110]	2	0.02	39
	UHT [290]	23	0.08	51
	EXTR COLD [88]	6	0.07	29
	EXTR HOT [225]	18	0.08	57
	PEF [203]	19	0.09	57
	HOMO [163]	11	0.07	42
Not careful	PAST [125]	6	0.05	41
	MICRO [160]	5	0.03	45
	HPP [110]	4	0.04	39
	UHT [290]	13	0.04	51

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

	EXTR COLD [88]	2	0.02	29
	EXTR HOT [225]	10	0.04	57
	PEF [203]	9	0.04	57
	HOMO [163]	6	0.04	42

[1]Respondents who stated ‚I don't know' in F540.

The reasons which were most frequently mentioned for the unsuitability of a processing method for organic processing were related to the categories 'product stress', 'loss in nutrients', and 'loss in naturalness'. For ultra high temperature (UHT) treatment, reasons most often related to 'product stress' (mean = 0.33), followed by 'loss in nutrients' (mean = 0.29), and 'loss in naturalness' (mean = 0.22). For hot extrusion, reasons also most often related to the category 'product stress' (mean = 0.33), followed by 'loss in nutrients' (mean = 0.21), and 'loss in naturalness' (mean = 0.21). For pulsed electric fields (PEF), reasons also most often related to 'product stress' (mean = 0.26), followed by 'loss in naturalness' (mean = 0.23), and 'loss in nutrients' (mean = 0.11).

Only rearely reasons related to the categories 'loss in taste', 'loss in structure', 'personal/ health risk', 'environmental stress', or 'not careful'.

5.4.2 Respondents' expectations and preferences with respect to organic food and the processing of organic food

To examine respondents' expectations and preferences with respect to organic food and its processing, they were asked (1) to indicate the importance they attributed to the careful processing of organic food and their willingeness to pay more for it, (2) to evaluate different statements about organic food as well as the processing of organic food, (3) including statements on processing-related on-product information, shelf life, and packaging for organic food.

Table 34 shows the importance respondents attributed to the careful processing of organic food and their willingness to pay more for organic food that is carefully processed.

Table 34: Importance and willingness to pay more for carefully processed organic food (F560).

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Statements:	Country	Mean[1]	Std. dev. [1]	p-value	Non-resp.[2]	Missings[3]
F560_1: It is very important to me that organic food is processed as carefully as possible.	DE [515]	5.78	1.27	0.004	17	68
	CH [634]	5.58	1.30		16	37
F560_2: I am absolutely willing to pay more for carefully processed organic food than for not carefully processed organic food.	DE [517]	4.85	1.64	0.046	15	68
	CH [636]	4.64	1.70		14	37

[1]Values are based on a 7-Point-Likert Scale: 1 'I fully disagree' to 7 'I fully agree'.
[2]Respondents who selected 'I don't know' were excluded from the calculations.
[3]Respondents who stated to never buy organic food in F500 were excluded from this question.

The results show that careful processing of organic food was considered very important by the respondents of both samples and that they would be willing to pay more for carefully processed organic food. Both statements scored significantly higher in the German sample. Furthermore, both importance and willingness to pay for carefully processed organic food was found to increase with increasing organic purchase frequency. With a coefficient of 0.21 in Germany and 0.33 in Switzerland, the correlation for the importance of careful processing for organic food was quite large. Also the correlation for willingness to pay for more carefully processed organic food was quite large, with a coefficient of 0.48 in Germany and 0.52 in Switzerland.

These results are very similiar to the results obtained for the importance and willingness to pay for carefully processed food more generally.

Table 35 shows the results of the evaluation of different statements about organic food.

Table 35: Respondents' expectations about organic food (F550).

Statements: In comparison to conventional food, organic food: …	Country	Mean[1]	Std. dev. [1]	p-value	Non-resp.[2]
F550_1: …is healthier.	DE [571]	4.74	1.6	0.494	29
	CH [668]	4.64	1.69		19
F550_2: …is better digestible.	DE [558]	4.34	1.62	0.011	42

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

	CH [655]	4.05	1.78		32
F550_3: …more natural.	DE [579]	5.05	1.6	0.413	21
	CH [665]	4.96	1.64		22
F550_5: …tastes better.	DE [571]	4.44	1.69	0.134	29
	CH [670]	4.27	1.73		17
F550_6: …is better for the environment.	DE [565]	4.98	1.58	0.507	35
	CH [659]	4.99	1.65		28
F550_7: …contains more valuable nutrients.	DE [566]	4.78	1.58	0.223	34
	CH [656]	4.62	1.67		31
F550_9: …more carefully processed.	DE [552]	4.84	1.55	0.072	48
	CH [635]	4.67	1.6		52
F550_10: …better for animal welfare.	DE [568]	5.09	1.68	0.588	32
	CH [657]	5.05	1.64		30
F550_12: …more trustworthy.[3]	DE [582]	4.19	1.9	0.804	18
	CH [672]	4.22	1.83		15

[1]Values are based on a 7-Point-Likert Scale: 1 'I fully disagree' to 7 'I fully agree'.
[2]Respondents who selected 'I don't know' were excluded from the calculations.
[3]Statements 3, 8, and 11 are not shown here as they were only included to counterbalance the overly positive formulation of the statements.

The statements German and Swiss respondents rather agreed with were that organic food „is better for animal welfare", „is better for the environment", „is more natural", „is more carefully processed", „is healthier", and „contains more valuable nutrients". The statements they were rather unsure about were that organic food „tastes better", „is more trustworthy", and „is better digestable".

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

In both samples, the agreement with these nine statements was found to increase with increasing organic purchase frequency. In Germany, correlation coefficients ranged between 0.22 and 0.54. In Switzerland, correlation coefficients ranged between 0.26 and 0.56. The statement with the highest correlation coefficient was in both countries „…more trustworthy".

Table 36 shows the results of the evaluation of different statements about the processing of organic food including statements on processing-related on-product information, shelf life and packaging for organic food.

Table 36: Respondents' expectations about the processing of organic food (F560).

Statements:	Country	Mean[1]	Std. dev.[1]	p-value	Non-resp.[2]	Missings[3]
F560_3: It is very important to me that an organic food product can be preserved as long as possible.	DE [513]	4.01	1.78	0.007	19	68
	CH [637]	4.29	1.66		13	37
F560_4: Ready-made meals are a contradiction to 'Bio' (=organic).	DE [511]	4.49	1.79	0.302	21	68
	CH [627]	4.59	1.67		23	37
F560_5: Very heavily processed products are a contradiction to 'Bio' (=organic).	DE [510]	5.50	1.39	0.002	22	68
	CH [619]	5.21	1.48		31	37
F560_6: I have confidence that the processing of organic food complies with the highest quality standards.	DE [518]	5.15	1.56	0.570	14	68
	CH [637]	5.23	1.46		13	37
F560_7: It is very important to me that the packaging of an organic food product indicates clearly how it has been processed.	DE [516]	5.79	1.27	0.000	16	68
	CH [633]	5.44	1.41		17	37

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

F560_8: It is very important to me that an organic food product is packaged as environmentally friendly as possible.	DE [522]	5.93	1.31	0.048	10	68
	CH [637]	5.80	1.32		13	37
F560_9: The opinion of consumers should be given more weight, when deciding which processing methods should be permitted for organic food.	DE [498]	5.10	1.40	0.000	34	68
	CH [616]	4.76	1.41		34	37

[1]Values are based on a 7-Point-Likert Scale: 1 'I fully disagree' to 7 'I fully agree'.
[2]Respondents who selected 'I don't know' were excluded from the calculations.
[3]Respondents who stated to never buy organic food in F500 were excluded from this question.

In both countries the agreement on the use of environmentally friendly packaging for organic food was very high. The statement on the availability of processing-related on-product information came second in both countries, but the agreement was significantly lower in Switzerland than in Germany. The agreement on the statement that "very heavily processed products are a contradiction to organic" was also rather high, coming third in Germany and fourth in Switzerland. However, the agreement on "ready-made meals are a contradiction to organic" was significantly lower in both countries. The statement respondents of both countries agreed with the least, was that "it is very important…that an organic food product can be preserved as long as possible".

The results on the importance of processing-related on-product information and environmentally friendly packaging for organic food are very similar to the results which were obtained on the same statements but for food more generally. The results on shelf life, however, are significantly different. For food in general respondents stated that it was rather important to them that the shelf life of a product is as long as possible, with a significantly higher score in Switzerland than in Germany (MDE = 4.51; MCH = 4.89). For organic food the importance of a long shelf life was significantly lower, but again significantly higher for Swiss than for German respondents (MDE = 4.01; MCH = 4.29).

Organic purchase frequency was found to significantly correlate, with a coefficienct larger 0.2, with the statements on high quality standards, on-product information, environmentally friendly packaging, and consumers' involvement (only in Switzerland).

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

6. Summary of the main results and conclusions

6.1 Processing of milk

What role does processing play in consumers' milk choice behaviour?

- Which milk (UHT, pasteurized, raw) do people consume?

Respondents' milk consumption consisted to large amounts of UHT and pasteurized milk, with a larger share in UHT milk, particularly in Germany.

Differences between DE and CH: For German respondents the share of UHT milk consumed was significantly higher than for Swiss respondents.

Differences between organic consumer groups: There was a significant difference in shares between organic consumer groups, with the share of UHT milk decreasing and the share of pasteurized and raw milk increasing with increasing organic purchase frequency.

- Are consumers familiar with the processing methods used for milk?

Respondents were familiar with methods where the milk is heated, except for high pasteurization, but not familiar with methods where the milk is filtrated or put under pressure. (For pressure this came not as a surprise, as high pressure processed milk is not on the market yet, neither in Germany nor in Switzerland.)

Differences between DE and CH: Swiss respondents tended to be more familiar with processing methods to extend the shelf life of milk than German respondents.

Differences between organic consumer groups: No differences found.

- Is processing an important purchase criterion for milk?

The low Adjusted R^2 values we obtained in the latent class models, ranging from 0.11 to 0.15, same as the results of the quantitative survey show that the processing method itself only plays a minor role when it comes to purchase milk, whereas freshness, taste, price and shelf-life are more relevant as shown in the quantitative survey. In addition, consumers' self-reported level of information on milk processing methods was rather low. The relatively low level of knowledge and relevance of processing methods limits the consumers' ability in participating in the decision whether a processing method fits with the organic principles or not. However, processing plays a hidden role in the purchase of milk. Whereas processing was considered a (relatively) unimportant criterion in the purchase of milk, the processing-related attributes taste, freshness, and

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

shelf-life were considered (relatively) important. Processing was about equally important as nutritional value, which is also a processing-related attribute, and production system (organic vs. conventional).

Differences between DE and CH: For German respondents the attribute fat content was significantly more important than for Swiss respondents and for Swiss respondents the attribute country of origin was significantly more important than for German respondents. Processing was among the three least important attributes in both countries, but significantly more important in Switzerland than Germany.

Differences between organic consumer groups: The importance of the attributes ‚production system' ‚regional origin', ‚country of origin', and ‚processing' were found to increase with increasing organic purchase frequency and the importance of ‚price', ‚shelf life', ‚taste', ‚fat content', and ‚packaging' were found to decrease with increasing organic purchase frequency.

- Which processing method do consumers prefer for milk and why?

When compiling their favourite milk offer, respondents preferred the method they were most familiar with, namely pasteurization, in spite of its lower shelf life.

Differences between DE and CH: In both countries, pasteurization was preferred, but somewhat more in Switzerland. In Germany, respondents' preference for microfiltration was stronger than in Switzerland.

Differences between organic consumer groups: The share of respondents who preferred high pressure processing was significantly lower for heavy organic consumers than for occasional and rare organic consumers.

In the choice experiment, a preference for homogenised milk was observed neither in the organic nor in the non-organic consumer segments. We assume that due to low availability of non-homogenised milk, most consumers have not experienced the sensorial differences between homogenised and non-homogenised milk so far and thus are not able forming an opinion or preference regarding this method. Further research including tastings might provide more additional information on consumer preferences regarding homogenisation.

- If consumers are informed about the impacts of processing on taste and nutrients, which processing method do they then prefer for milk and why?

If respondents were informed about the impacts of processing on taste and nutrients before compiling their favourite milk offer, this led to a significant change in preferences in favour of the method with the smallest impacts, in spite of its novelty.

Differences between DE and CH: No differences found.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Differences between organic consumer groups: Again, the share of respondents who preferred high pressure processing was significantly lower for heavy organic consumers than for occasional and rare organic consumers. In contrast, the share of respondents who preferred microfiltration was significantly higher for heavy organic consumers than for occasional and rare organic consumers. In the choice experiment, consumers less preferred microfiltratied & pasteurized milk, when being informed about the impact of the processing method on taste and nutrient content.

Conclusions

Processing indirectly plays an important role in consumers' milk choice behaviour in that it affects the product attributes taste, freshness, and shelf-life, which are important to consumers.

The more consumers buy organic food, the more they pay attention to processing and the less they place emphasis on shelf life.

Consumers are sceptical towards new milk processing methods and prefer the method they know.

Information about the benefits of a new milk processing method in terms of shelf life, taste, and nutritional value can lead to a significant shift in preferences in favour of the new method.

Hence, raising consumers' awareness about impacts of processing on relevant product attributes is crucial (to help them shape their preferences).

6.2 Careful processing

- What role does "careful processing" play in consumers' food choice more generally?What is consumers' concept of careful processing?

The evaluation of the concept of careful processing showed that consumers' focus was on the maintenance of taste, vitamins and (micro-) nutrients, whereas the maintenance of vitamins and (micro-) nutrients are more relevant for organic consumers than for non-organic consumers. Mean values were generally higher in the German sample than in the Swiss sample, and significant so for the statements on taste, naturalness, environmental pollution, and authenticity. Furthermore, the non-response was substantially higher for the statement 'carefully processed food products pollute the environment less' than for the other statements. The evaluation, furthermore, showed that consumers have a very low acceptance of modification/loss/impact through processing. In other words, consumers' expectations towards carefully processed food are far too high and can hardly be fulfilled by any no matter how careful processing

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

method. Again, it might be questioned what role the consumers as a stakeholder group play in the process of developing a common code of practice for organic processing.

- What is the importance of 'careful processing'?

Still, consumers in both countries considered careful processing as very important. This was found that especially consumers in Switzerland would be willing to pay more for carefully processed products. Furthermore, both importance and willingness to pay for carefully processed products was found to increase with increasing organic purchase frequency. Thus, we conclude that careful processing offers organic producers and processors the possibility to further differentiate their food products in the market. If organic processors choose a careful processing method, this should be communicated to the consumers to increase the perceived attractiveness of the product.

- Which processing methods do consumers perceive as more careful? Which do they perceive as less careful?

Respondents perceived high pressure processing (HPP), pasteurization, cold extrusion, microfiltration, and homogenization as most careful. Ultra-high temperature treatment (UHT), hot extrusion, and pulsed electric fields were perceived as least careful.

The evaluation of processing methods with respect to "carefulness" seemed to be easier the more respondents knew about the processing method.

Differences between treatment groups: Respondents of treatment group two perceived HPP milk as more carefully processed and pasteurized milk and UHT milk as less carefully processed than respondents of treatment group one.

Differences between DE and CH: German respondents perceived HPP milk as more carefully processed than Swiss respondents.

Differences between organic consumer groups: No relevant differences found.

- How is the concept of "careful processing" understood by consumers?

Respondents associated "careful processing" particularly with "maintenance of nutrients", „maintenance of naturalness", and „low product stress". Accordingly, they also perceived carefully processed food as very nutritious and natural.

Differences between treatment groups: The „maintenance of nutrients" was significantly more mentioned by respondents of treatment group two than treatment group one. Respondents of treatment group two also perceived carefully processed food as significantly more nutritious, healthy, and tasty than respondents of treatment group one.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Differences between DE and CH: German respondents perceived carefully processed food as significantly more tasty, natural, environmentally friendly, and authentic.

Differences between organic consumer groups: The higher a respondent's organic purchase frequency, the more nutritious and natural, but also the tastier, healthy, authentic, and environmentally friendly carefully processed food was perceived.

- What are consumers' expectations with respect to careful processing?

Respondents' expectations with respect to careful processing were very high. Most of them accepted no or only minimal impacts on nutrients, taste, and naturalness. With respect to environmental impacts they were somewhat more tolerant.

Differences between treatment groups: No differences found.

Differences between DE and CH: German respondents were significantly less tolerant with respect to environmental impacts than Swiss respondents.

Differences between organic consumer groups: No differences found.

- Is careful/ minimal processing important to consumers?

Respondents considered careful processing to be very important and stated to be willing to pay more for carefully processed food.

Respondents also considered it very important, that a processing method is communicated on a product's packaging and that the packaging is as environmentally friendly as possible. A as long as possible shelf life was considered as less important.

Differences between DE and CH: German respondents expressed a stronger willingness to pay more for carefully processed food than Swiss respondents. Also the importance of processing-related on-product information was significantly higher in Germany. The importance of shelf life was significantly higher in Switzerland.

Differences between organic consumer groups: The importance of carefully processed food, the willingness to pay more for carefully processed food, the importance of processing-related on-product information, and the importance of environmentally friendly packaging were found to increase with increasing organic purchase frequency. In contrast, the importance of a as long as possible shelf life was found to decrease with increasing organic purchase frequency.

Conclusions:

From a consumer perspective, careful processing leads to no or only minimal losses in (valuable/ relevant) nutrients, keeps the food as natural as possible, and minimises product stress. Accordingly, carefully processed food is perceived as having a higher content in (valuable/ relevant) nutrients and as being more natural.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Careful processing is important to consumers and they would be willing to pay more for carefully processed food.

Information about processing is important to consumers.

Environmentally friendly packaging is important to consumers.

Maximum shelf life is less important to consumers.

Frequent organic consumers have higher expectations towards careful processing and consider it as more important than less frequent organic consumers.

6.3 Organic processing

What are organic consumers' expectations towards the processing of organic food?

- Which processing methods do organic consumers perceive as suitable for organic food?

The results from the quantitative survey show that the methods which were perceived as more careful, namely high pressure processing, pasteurization, cold extrusion, microfiltration, and homogenization, were also perceived as more suitable for the processing of organic food. However, methods generally scored higher with respect to the suitability for organic processing than with respect to careful processing. Thus, cold and hot extrusion were considered as significantly more suitable for the processing of organic food than they were considered as careful. Hence, respondents seem to be somewhat more tolerant when it comes to organic than when it comes to careful processing.

The most important reasons why ultra-high temperature processing, hot extrusion, and pulsed electric fields were not perceived as suitable for organic processing were "product stress", "loss in nutrients", and "loss in naturalness". Hence, as for careful processing, "low product stress", "maintenance of nutrients" and "the maintenance of naturalness" seem to be three very important components/ aspects of organic processing.

Differences between treatment groups: Respondents of treatment group two perceived pasteurization as significantly less suitable for organic processing and high pressure processing as significantly more suitable for organic processing than respondents of treatment group one.

Differences between DE and CH: German respondents perceived high pressure processing, cold extrusion, and pulsed electric fields as significantly more suitable for organic processing than Swiss respondents.

Differences between organic consumer groups: No relevant differences.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

The results of the choice experiment suggest that high pressure processing has a high acceptance among organic consumers in Germany and Switzerland. In contrast, micro pasteurisation is less accepted than pasteurisation and high pressure processing among organic consumers.

- How is the concept of "organic" understood by consumers?

Compared to conventional food, organic food is perceived as better for animal welfare, better for the environment, more natural, more carefully processed, healthier, and to have a higher content in valuable nutrients. Furthermore, very heavily processed food products were perceived as a contradiction to ‚organic' and also ready-made meals were perceived as rather unsuitable for ‚organic'.

Differences between DE and CH: German respondents agreed significantly more with the statement that very heavily processed products are a contradiction to organic.

Differences between organic consumer groups: The higher respondents' organic purchase frequency the better for animal welfare, the better fort he environment, the more natural, the more carefully processed, the healthier, and the more nutritious organic food was perceived.

- Is careful/ minimal processing important to consumers in the context of organic food?

As for food more generally, careful processing was considered to be very important for organic food and respondents were also willing to pay more for carefully processed organic food. Processing-related on-product information and environmentally friendly packaging were also perceived to be important for organic food. A as long as possible shelf life, which was already considered less important for food in general, was considered even less important for organic food.

Differences between DE and CH: The importance of careful processing for organic food and the willingness to pay for carefully processed food scored significantly higher in Germany than in Switzerland. The importance of a as long as possible shelf life scored again higher in Switzerland than in Germany. The importance of processing-related on-product information and of environmentally friendly packaging was again higher in Germany than in Switzerland.

Differences between organic consumer groups: Both, importance and willingness to pay more for carefully processed organic food was found to increase with increasing organic purchase frequency. Also the importance of processing-related on-product information and enviornmentall friendly packaging increased with increasing organic purchase frequency.

Conclusions:

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

The concepts of careful processing and organic processing seem to match very well. For both concepts "the maintenance of nutrients", "the maintenance of naturalness" and "no/ low product stress" are important components/ aspects. It seems that consumers equal product modification through processing methods with "product stress" – the more modification the more stress. However, respondents seem to be more tolerant when it comes to organic than when it comes to careful processing.

Generally, careful processing is also considered important for organic food and it is considered more important by more frequent organic consumers.

Further conclusions

In communication with consumers, the expression «carefully processed» might give rise to overly high expectations. Accordingly, communication should rather focus on for consumers' tangible benefits like the preservation of a food's natural taste and nutritional content.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

7. References

Barański, M., Średnicka-Tober, D., Volakakis, N., Seal, C., Sanderson, R., Stewart, G., . . . Leifert, C. 2014. Higher antioxidant and lower cadmium concentrations and lower incidence of pesticide residues in organically grown crops: A systematic literature review and meta-analyses. *British Journal of Nutrition, 112*(5), 794-811.

Ben-Akiva, M. and Lerman, S. R. (1985). Discrete Choice Analysis: Theory and Application to Travel Demand, MIT Press, Cambridge.

BfS (Bundesamt für Statistik), 2019. Ständige Wohnbevölkerung nach Alter, Kanton, Bezirk und Gemeinde, 2010-2018 - 2010-2018 | Tabelle. Bundesamt für Statistik. Retrieved online from: https://doi.org/content/bfs/de/home/statistiken/bevoelkerung/stand-entwicklung/bevoelkerung.assetdetail.9635941.html (accessed 12.11.19).

Bio Suisse 2020. Biolandwirtschaft und Biomarkt. Bio in Zahlen. https://www.bio-suisse.ch/de/bioinzahlen.php (accessed 01.09.2020).

Bühl, A., 2014. SPSS 22: Einführung in die moderne Datenanalyse. 14., aktualisierte Aufl. ed, Always learning. Pearson, Hallbergmoos.

Carlsson, F. Frykblomb,P., Lagerkvist, K. J. 2005. Using cheap talk as a test of validity in choice experiments. Economics Letters 89 (2005) 147–152.

Cohen, J., 1988. Statistical power analysis for the behavioral sciences, 2nd ed. ed. L. Erlbaum Associates, Hillsdale, N.J.

Cox, D.N., Evans, G., 2008. Construction and validation of a psychometric scale to measure consumers' fears of novel food technologies: The food technology neophobia scale. Food Quality and Preference 19(8): 704–710. https://doi.org/10.1016/j.foodqual.2008.04.005

Döring, N., Bortz, J., 2016. Forschungsmethoden und Evaluation in den Sozial- und Humanwissenschaften, 5. vollständig überarbeitete, aktualisierte und erweiterte Auflage. ed, Springer-Lehrbuch. Springer, Berlin Heidelberg.

Field, A.P., 2009. Discovering statistics using SPSS: and sex, drugs and rock "n" roll, 3rd ed. ed. SAGE Publications, Los Angeles.

Gil, J.M. , Gracia, A. and Sanchez, M. 2000. Market segmentation and willingness to pay for organic food products, International Food and Agribusiness Management Review 3, 207–226.

Goyal, A., Sharma, V., Upadhyay, N., Sihag, M., Kaushik, R., 2013. High Pressure Processing and Its Impact on Milk Proteins: A Review. Research and Reviews: Journal of Dairy Science and Technology 2(1): 12–20.

Hensher, D. Greene, W. H. 2003. The mixed logit model: the state of practice, Trans- portation 30, 133–176.

Hensher, D. A., Rose, J. M., & Greene, W. H. 2005. Applied choice analysis. A Primer. Cambridge University Press, Cambridge.

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Hemmerich, W., n.d.a. Multiple Lineare Regression: Voraussetzungen. StatistikGuru. Retrieved online from https://statistikguru.de/spss/multiple-lineare-regression/voraussetzungen.html

Hemmerich, W., n.d.b. Multiple lineare Regression Voraussetzung #1: Lineare Beziehung zwischen den Variablen. StatistikGuru. Retrieved online from https://statistikguru.de/spss/multiple-lineare-regression/voraussetzung-lineare-beziehung-zwischen-den-variablen.html (accessed 3.9.20).

Hemmerich, W., n.d.c. Multiple lineare Regression Voraussetzung #4: Multikollinearität. StatistikGuru. Retrieved online from https://statistikguru.de/spss/multiple-lineare-regression/voraussetzung-multikollinearitaet.html (accessed 3.9.20).

Kline, R.B., 2005. Principles and practice of structural equation modeling, 2nd ed. ed, Methodology in the social sciences. Guilford Press, New York.

Kozup, J.C., Creyer, E.H., Burton, S., 2003. Making Healthful Food Choices: The Influence of Health Claims and Nutrition Information on Consumers' Evaluations of Packaged Food Products and Restaurant Menu Items. Journal of Marketing 67(2) 19–34. https://doi.org/10.1509/jmkg.67.2.19.18608

Lammers, P., Ullmann, L.M., Fiebelkorn, F., 2019. Acceptance of insects as food in Germany: Is it about sensation seeking, sustainability consciousness, or food disgust? Food Quality and Preference 77: 78–88. https://doi.org/10.1016/j.foodqual.2019.05.010

Lancaster, K. 1966. A New Approach to Consumer Theory. Journal of Political Economy, 74, 132-157.

McFadden, D. 1974. Conditional logit analysis of qualitative choice behaviour, in: P.E. Tarembka (Ed.), Frontiers in Econometrics, Academic Press, New York, 1974, pp. 105–141.

Milchindustrie-Verband e.V., n.d. ESL-Milch. Meine Milch, Milkipedia. Retrieved online from https://www.meine-milch.de/milkipedia/esl-milch (accessed 9.20.19).

Preuße, T., n.d. Frischmilch und ESL-Milch - Infos über pasteurisierte Milch. Retrieved online from https://www.milch-guide.de/milchsorten/frischmilch-pasteurisierte.php (accessed 9.20.19).

Raab-Steiner, E., Benesch, M., 2018. Der Fragebogen: von der Forschungsidee zur SPSS-Auswertung, 5., aktualisierte und überarbeitete Auflage. ed, UTB Schlüsselkompetenzen. Facultas, Wien.

Richter, T., Schmid, O., Hempfling, G., Bahrdt, K., 2004. Ermittlung von zusätzlichen Nachfragepotentialen zur Erhöhung des Absatzes von Biomilch in der Schweiz. FiBL.

Schaack, D., 2020. Branchenreport 2020. Bund Ökologische Lebensmittelwirtschaft e.V. (BÖLW), Berlin.

Sajdakowska, M., Królak, M., Zychowicz, W., Jeżewska-Zychowicz, M., 2018. Acceptance of Food Technologies, Perceived Values and Consumers' Expectations towards Bread. A Survey among Polish Sample. Sustainability 10(4): 1281. https://doi.org/10.3390/su10041281

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Stahel, W., 2013. Lineare Regression (Statistikskript). Zürich. https://stat.ethz.ch/~stahel/courses/regression/reg1-script.pdf

Stolz, H., Bodini, A., Stolze, M., Hamm, U., and Richter, T. 2009. Lebensmittelqualität aus der Verbraucherperspektive – eine Synthese qualitativer Studien zur Wahrnehmung und Beurteilung verschiedener Qualitätskriterien bei Öko-Produkten. Berichte über Landwirtschaft 87, Zeitschrift für Agrarpolitik und Landwirtschaft. Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz (Ed.), Kohlhammer, Stuttgart, 153-182.

Stratakos, A .Ch. Inguglia, E.S., Linton, M., Tollerton, J., Murphy, L., Corcionivoschi, N., Koidis, A., Tiwari, B.K., 2019. Effect of high pressure processing on the safety, shelf life and quality of raw milk. Innovative Food Science & Emerging Technologies 52: 325–333. https://doi.org/10.1016/j.ifset.2019.01.009Tessmar, A., 2019. D-P19-10454 FiBL online study, DE, CHE: Bilder für Teil Choice Experiment – SL. Email, internal communication.

Trujillo, A.J., Capellas, M., Saldo, J., Gervilla, R., Guamis, B., 2002. Applications of high-hydrostatic pressure on milk and dairy products: a review. Innovative Food Science & Emerging Technologies 3(4): 295–307. https://doi.org/10.1016/S1466-8564(02)00049-8

Urban, D., Mayerl, J., 2006. Regressionsanalyse: Theorie, Technik und Anwendung, 2., überarb. Aufl. ed, Studienskripten zur Soziologie. VS, Verl. für Sozialwiss. [u.a.], Wiesbaden.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

8. Appendix

A: Questionnaire[1]

WELCOME AND INTRODUCTION
Hello Thank you for participating in this 20 minutes long survey about food. The survey is part of an international research project. Thus, the results will only be used for research purposes. Note: There are no right or wrong answers, it is about your personal attitude. We treat all your answers and personal information strictly confidential. The data analysis is anonmyzed and the data will not be passed on to unauthorized third parties. Please be aware that the participation in this questionnaire is voluntary. You can terminate the questionnaire at any time. You can also request the deletion of your answers at any time, without facing any disadvantages. If you have questions or comments to this questionnaire/ survey, we are at your disposal: feedback @fibl.org Please press ">" to start.

S01	
What gender do you attribute yourself to?	Code
Male	1
Female	2
Other/diverse	88

S02
Please enter your age: _____

S07
What would you estimate, how many liters of cow's milk are consumed in your household on average per week? Note: Please respond to this question considering your whole household. The consumption of milk includes milk for drinking (full-fat or low-fat) that you drink, add to another drink or meal or milk that you use for cooking or baking. Note: 1 deciliter = 0.1 liters
Weekly milk consumption of cow's milk in liters: _____

F100

[1] Original German version can be obtained from the authors.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Let us stay with milk (it always refers to cow's milk).
Below you see some criteria that might be important when purchasing milk. Please move the six most important criteria for your milk purchase to the right. Please start with the most important criterium.

Note: We know that some criteria might be of equal importance. Nevertheless, please select your six most important criteria and order them according to their importance.

Code 1	Price
Code 2	Production system (organic or not organic)
Code 3	Region of origin
Code 4	Fat content
Code 5	Processing
Code 6	Brand
Code 7	Shelf life
Code 8	Packaging
Code 9	Taste
Code 10	Freshness
Code 11	Country of origin
Code 12	Nutritional value

F110

A lot of food is subject to more or less long processing to make it edible/drinkable, change its texture or taste, make it better digestible or to increase its shelf-life.

The milk available in supermarkets (full-fat or low-fat) is processed as well and thus has a longer shelf-life than raw milk. Which kinds of preservation of milk do you know, also if only by name? Please answer spontaneously.

OPEN TEXT FIELD (including ‘I don’t know’ option)

F120

Here we have raw milk and two other differently processed milk types, namely pasteurized milk (short: past. milk) and ultra-high temperature treated milk (short: UHT milk).
Please indicate how the weekly milk consumption of your household is distributed among raw milk, past. milk and UHT milk. The sum must be 100%.

Example: If only UHT milk is consumed in your household, please enter 100 for UHT milk and leave the other boxes at 0.

Code 1	Raw milk
Code 2	Pasteurized milk
Code 3	UHT milk

F200

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

In the following we will give you some information on the processing of milk. Please read this information carefully.

Raw milk is an easily perishable food product. Thus, it is processed before sale. In doing so, germs causing spoilage are destroyed and the shelf-life of the milk is prolonged. Only in rare cases, milk is sold unprocessed and raw, e.g. as 'milk from the farm'.

In retail markets fresh milk, positioned on the cooling shelf, is distinguished from ultraheat-treated milk (UHT milk), not positioned on the cooling shelf, depending on the processing method.

In the following, it is only about fresh milk (not about UHT milk). First of all, we will present you three methods for processing raw milk to fresh milk.

Please press '>' to continue.

F210 (Information treatment)

Pasteurization

Preservation through heating:
During the pasteurization raw milk is heated up to around 74 degrees for a short time (approx. 20 seconds) and then immediately cooled down.

During this process, the germs present in the milk are destroyed through heating.

Pasteurization is a common process to preserve milk.

Shelf-life of pasteurized milk:
Unopened and cooled around 10 days.

Mikrofiltration and pasteurization

Preservation through filtration and heating:
During the mikrofiltration, raw milk is separated into skimmed milk and cream.

The skimmed milk is preheated (up to approx. 50 to 55 degrees) and filtrated. Thereby, the germs present in the milk are filtered out of the milk.

The cream is heated up to approx. 125 degrees for a very short time (approx. 2 seconds) and then immediately cooled down.
The filtered skimmed milk and the cooled cream are merged again and pasteurized (heated up to around 74 degrees for approx. 20 seconds).

During this process, the germs present in the milk are destroyed through filtration and heating.

Mikrofiltration is a common process to prolong the shelf-life of pasteurized milk.

Shelf-life of mikrofiltrated and pasteurized milk:
Unopened and cooled around 21 days.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

High-pressure processing

Preservation through pressure:
For high-pressure processing, milk is first of all filled in bottles and placed into a tank filled with water where very high pressure of approx. 600 megapascal is applied for around 5 minutes.

During this procedure, milk is not heated. Germs present in the milk are distroyed only by pressure.

High-pressure processing is a new processing method for the preservation of milk and thus only little in use so far.

Shelf-life of high-pressure processed milk:
Unopened and cooled approx. 21 days.

*For comparison: A pressure cooker has a maximum pressure of 0.2 megapascal.

F220

Processing can negatively affect the nutrient content and the taste of raw milk.

Background knowledge:
- Raw milk is an important source of the vitamins B2, B5, B12, A, and D. The last four are heat-sensitive. None of these is pressure-sensitive.
- Furthermore, raw milk is an important source of the minerals phosphorus, calcium, zinc, magnesium, and iodine. Minerals are neither heat- nor pressure-sensitive.

Heating:
- Causes a loss of vitamins: The higher heated, the higher the loss.
- Causes alterations in taste: The higher heated, the stronger the cooking taste.

High pressure:
- Does not cause a loss of vitamins. The vitamin content is similar to raw milk.
- Does not cause alterations in taste: The taste is similar to raw milk.

Filter: Only treatment group 2

F230

How far do you agree with the following statements about the information you just read?

		Scale						
		7	6	5	4	3	2	1
Code 1	The information on pasteurization was completely new for me.							
Code 2	The information on microfiltration was completely new for me.							
Code 3	The information on high pressure processing was completely new for me.							
Code 4	The information on the impacts of the processing methods was completely new for me.							

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Code 5	With this information I feel adequately informed to evaluate very well which of the three types of milk I would choose in the store.							

Scale: 7 = I fully agree, 4 = I neither agree nor disagree, 1 = I fully disagree.

F240

Now we are interested in your preferences concerning fresh milk. Please read the following information carefully. This is necessary to answer the following questions.

Please imagine being in a supermarket where you want to buy one litre of fresh milk. On the following pages we will present you six times with in each case two different offers of fresh milk that differ in: processing method, production system (organic or not organic), origin, and homogenization (homogenized or not homogenized) and price. All other properties of the fresh milk are equal.

Please alwas choose the offer you find most attractive. If none of the offers appeals to you, you can choose 'none of these offers'. Again: There are no right or wrong responses. We are interested in your preferences.

Below you can see an example.

[SHOW EXAMPLE]

Please press ">" to get to the first choice.

F250 (This question consisted of 6 choice sets)

Which freshmilk would you buy? Please always choose the offer you find most attractive. If none of the offers appeals to you, you can choose 'none of these offers'.

Note: It might be that an offer does not seem resonable to you. Nevertheless, please imagine that you may find this offer on the cooling shelf of a supermarket and you are able to buy it.

[SHOW CHOICE SET]

F300

What would be your favorite type of milk and how much would you be willing to pay for it?	Code
Code 1: Processing method	
Pasteurization	1
Microfiltration and pasteurization	2
High pressure processing	3
Code 2: Production system	
Organic	1
Not organic	2
Code 3: Origin	
Country of origin, not regional	1
Country of origin, regional	2
Code 4: Homogenization	

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Not homogenized	1
Homogenized	2
Code 5: Maximum Willingness to Pay	
OPEN NUMBER FIELD	

F310

Why is the processing method [INSERT "F300 CODE 1"] most attrative to you?

OPEN TEXT FIELD

F400

Now, it is about the processing of food in general.

How far do you agree or disagree with the following statements?

Note: If you click on the info button, you will get further information on the processing of the respective food.

		Scale							
		7	6	5	4	3	2	1	99
Code 1	Pasteurized milk is processed very carefully. [INFO BUTTON]								
Code 2	Microfiltrated and pasteurized milk is processed very carefully. [INFO BUTTON]								
Code 3	High pressure processed milk is processed very carefully. [INFO BUTTON]								
Code 4	Ultra-high temperature processed milk (UHT milk) is processed very carefully. [INFO BUTTON]								
Code 5	Cold extruded pasta is processed very carefully. [INFO BUTTON]								
Code 6	Hot extruded cereals are processed very carefully. [INFO BUTTON]								
Code 7	Fruit juice treated with pulsed electric fields is very carefully processed. [INFO BUTTON]								
Code 8	Homogenized milk is processed very carefully. [INFO BUTTON]								

Scale: 7 = I fully agree, 4 = I neither agree nor disagree, 1 = I fully disagree, 99 = I do not know.
Info button Code 1: The milk is heated briefly (about 20 seconds) to about 74 degrees Celsius and then immediately cooled down again. This kills off germs that cause spoilage and the milk can be kept unopened and cooled for about 10 days.
Info button Code 2: The milk is first separated into skim milk and cream. The skimmed milk is preheated (to approx. 50 to 55 degrees Celsius) and filtered, whereby germs present in the milk are "filtered out". The cream is heated very briefly (for about 2 seconds) to about 125 degrees Celsius and then immediately cooled down again. The filtered skim milk and the cooled cream are then mixed together again and pasteurised (heated to about 74 degrees Celsius for about 20 seconds). The milk can be kept unopened and cooled for about 21 days.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Info button Code 3: The milk is first bottled and then subjected to a very high pressure of about 600 megapascals in a tank filled with water for about 5 minutes. The milk can be kept unopened and cooled for about 21 days.
Info button Code 4: The milk is heated to 135-155 degrees Celsius for a few seconds and then immediately cooled down again. This kills off germs that cause spoilage and the milk can be stored unopened and uncooled for about 90 days.
Info button Code 5: The dough, consisting of cereal flour, water and, where appropriate, other ingredients, is pressed out of a shaping opening under pressure (approximately 6 to 9 megapascals). This gives the dough a desired structure and shape.
Info button Code 6: The dough, consisting of cereal semolina and other ingredients, is heated briefly to about 130 to 180 degrees Celsius and pressed under pressure (about 12 to 25 megapascals) out of a shaping opening, where it expands and is formed into the desired cereal shape. The product is ready to eat.
Info button Code 7: Freshly squeezed fruit juice is subjected to brief electrical impulses. This kills off germs that cause spoilage and the freshly pressed fruit juice can be stored unopened and refrigerated for about 21 days. In this process the fruit juice is not heated.
Info button Code 8: The fat droplets contained in the milk are evenly broken up under pressure (max. 12 megapascals). This refines the milk and prevents creaming. The milk is not preserved with this method.

F410

Please describe by keywords what careful processing is to you.

Note: If you do not know what 'careful processing' is, please write down what you think about when you hear or read the word 'careful' in the context of 'processing'.

OPEN TEXT FIELD

F420

How far do you agree or disagree with the following statements about the careful processing of food?

		Scale							
		7	6	5	4	3	2	1	99
Code 1	It is very important to me that a food product is processed as carefully as possible.								
Code 2	I am definitely willing to pay more for carefully processed food.								

Scale: 7 = I fully agree, 4 = I neither agree nor disagree, 1 = I fully disagree, 99 = I do not know.

F430

How far do you agree or disagree with the following statements about the careful processing of food?

'Carefully processed food products...

		Scale							
		7	6	5	4	3	2	1	99
Code 1	...are healthier.‘								
Code 2	…have a better taste.’								
Code 3	…contain more valuable nutrients.’								
Code 4	…are more natural.’								
Code 5	…pollute the environment less.’								
Code 6	…are more authentic.’								

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Scale: 7 = I fully agree, 4 = I neither agree nor disagree, 1 = I fully disagree, 99 = I do not know.

F440										
Assuming the four below listed categories (minerals, vitamins, taste, and environmental impact) act as criteria to decide whether a food product is carefully processed or not. How well should a processed food product at least perform in the following four categories to still be considered carefully processed?										
		Scale								
		7	6	5	4	3	2	1	99	77
Code 1	Taste									
Code 2	Vitamins									
Code 3	Minerals									
Code 4	Environmental impact (water/energy consumption, CO2 emissions)									

Scale of Code 1: 7 = No alteration: The taste of the processed food product is equal to the taste of the unprocessed food product., 6 = very little alteration, 5 = little alteration, 4 = moderate alteration, 3 = big alteration, 2 = very big alteration, 1 = Complete alteration: The taste of the processed food product is completely different from the taste of the unprocessed food product., 99 = I do not know, 77 = not relevant.
Scale of Code 2 and Code 3: 7 = No loss: All vitamins/minerals contained in the unprocessed food product are completely preserved., 6 = very small loss, 5 = small loss, 4 = moderate loss, 3 = high loss, 2 = very high loss, 1 = Complete loss: The vitamins/minerals contained in the unprocessed food product are completely lost., 99 = I do not know, 77 = not relevant.
Scale of Code 4: 7 = No impact: The processing does not have an impact on the environment., 6 = very small impact, 5 = small impact, 4 = moderate impact, 3 = big impact, 2 = very big impact, [1 = not eligible], 99 = I do not know, 77 = not relevant.
Filter: Only if F420 Code 1 equal or greater than 4 and smaller 99

F450									
How far do you agree or disagree with the following statements about processed food?									
		Scale							
		7	6	5	4	3	2	1	99
Code 1	It is very important to me that the packaging of a food product clearly indicates how the food product has been processed.								
Code 2	It is very important to me that a food product can be preserved for as long as possible.								
Code 3	It is very important to me that a food product is packaged as environmentally friendly as possible.								

Scale: 7 = I fully agree, 4 = I neither agree nor disagree, 1 = I fully disagree, 99 = I do not know.

F500							
Now we are interested in your consumption of organically certified food. Organically certified food is food that contain an organic label. On the right you see some example of organic labels.							
	Scale						
	7	6	5	4	3	2	1
How often is the food that you purchase for your private consumption organically certified?							

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Scale: 7 = (Almost) always, 6 = very often, 5 = rather often, 4 = sometimes, 3 = rather seldom, 2 = very seldom, 1 = never

F510							
	Scale						
	7	6	5	4	3	2	1
How often is the food that you purchase for your private consumption Demeter certified?							

Scale: 7 = (Almost) always, 6 = very often, 5 = rather often, 4 = sometimes, 3 = rather seldom, 2 = very seldom, 1 = never

F520									
How often do you buy the following foods in organic quality (with an organic label)?									
		Scale							
		7	6	5	4	3	2	1	0*
Code 1	Vegetables								
Code 2	Fruits								
Code 3	Eggs								
Code 4	Milk (for drinking)								
Code 5	Cheese								
Code 6	Other dairy products (e.g. yoghurt, butter, etc.)								
Code 7	Basic processed food (e.g. sugar, flour, oil, spices)								
Code 8	Wine								
Code 9	Pasta								
Code 10	Fresh meat								
Code 11	Sausages								
Code 12	Fish								
Code 13	Frozen food (e.g. fish fingers, fries)								
Code 14	Fresh bread								
Code 15	Other bakery goods (e.g. sweet pastry)								
Code 16	Convenience or ready-made products (e.g. pizza, sauces, mustard)								

Scale: 7 = (Almost) always, 6 = very often, 5 = rather often, 4 = sometimes, 3 = rather seldom, 2 = very seldom, 1 = never, 0 = I do not buy, *originally 99, recoded for the calculation of the means.
Filter: Only if F500 not equal 1.

F530								
Maybe some of the already mentioned processing methods are suitable for organic food and others are not suitable for organic food according to your opinion. Which of the following processing methods would you consider suitable for organic food?								
	Scale							
	7	6	5	4	3	2	1	99

CORE organic
PRO-ORG COORDINATOR CREA (ITALY)
THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Code 1	Pasteurization is a suitable processing method for organic food. [INFO BUTTON]								
Code 2	Microfiltration in combination with pasteurization is a suitable processing method for organic food. [INFO BUTTON]								
Code 3	High pressure processing is a suitable processing method for organic food. [INFO BUTTON]								
Code 4	Ultra-high temperature processing is a suitable processing method for organic food. [INFO BUTTON]								
Code 5	Cold extrusion is a suitable processing method for organic food. [INFO BUTTON]								
Code 6	Hot extrusion is a suitable processing method for organic food. [INFO BUTTON]								
Code 7	Pulsed electric fields are a suitable processing method for organic food. [INFO BUTTON]								
Code 8	Homogenization is a suitable processing method for organic food. [INFO BUTTON]								

Scale: 7 = I fully agree, 4 = I neither agree nor disagree, 1 = I fully disagree, 99 = I do not know.
Info button text was the same as in F400.
Filter: Only if F500 not equal 1.

F540

You assessed the following processing method(s) as rather not suitable for organic food: [IF F530 CODE 1 < 4 INSERT pasteurization; IF F530 CODE 2 < 4 INSERT mikrofiltration; IF F530 CODE 3 < 4 INSERT high-pressure processing; IF F530 CODE 4 < 4 INSERT ultra high temperature treatment; IF F530 CODE 5 < 4 INSERT cold extrusion; IF F530 CODE 6 < 4 INSERT hot extrusion; IF F530 CODE 7 < 4 INSERT pulsed electric fields; IF F530 CODE 8 < 4 INSERT homogenization]

Why do you consider this/these processing method(s) not suitable for organic food?

OPEN TEXT FIELD (including 'I don't know' option.

Filter: Only if F530 Code 1 to Code 8 at least once equal or smaller 3.

F550

How far do you agree or disagree with the following statements about organic food?

Note: conventional = not organic

		Scale							
		7	6	5	4	3	2	1	99
Code 1	Organic food is **healthier** than conventional food.								
Code 2	Organic food is better **digestible** than conventional food.								
Code 3	Organic food is more **natural** than conventional food.								

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Code 4	Organic food is **over-estimated.**								
Code 5	Organic food **tastes** better than conventional food.								
Code 6	Organic food is **better for the environment** than conventional food.								
Code 7	Organic food contains more **valuable nutrients** than conventional food.								
Code 8	I doubt that **'it really is organic if it claims to be organic'.**								
Code 9	Organic food is **more carefully processed** than conventional food.								
Code 10	Buying organic food I contribute to **better animal husbandry.**								
Code 11	Organic food is too **expensive.**								
Code 12	I **trust** organic food more than conventional food.								

Scale: 7 = I fully agree, 4 = I neither agree nor disagree, 1 = I fully disagree, 99 = I do not know.

F560

How far do you agree or disagree with the following statements about organic food?

		Scale							
		7	6	5	4	3	2	1	99
Code 1	It is very important to me that organic food is processed as carefully as possible.								
Code 2	I am definitely willing to pay more for carefully processed organic food than for not carefully processed organic food.								
Code 3	It is very important to me that an organic food product can be preserved as long as possible.								
Code 4	Ready-made meals are a contradiction to the organic concept.								
Code 5	Very heavily processed products are a contradiction to the organic concept.								
Code 6	I have confidence that the processing of organic food complies with highest quality standards.								
Code 7	It is very important to me that the packaging of an organic food product indicates clearly how it has been processed.								
Code 8	It is very important to me that an organic food product is packaged as environmentally friendly as possible.								
Code 9	The opinion of consumers should be given more weight, when deciding which processing methods should be permitted for organic food.								

Scale: 7 = I fully agree, 4 = I neither agree nor disagree, 1 = I fully disagree, 99 = I do not know.

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Filter: Only if F500 not equal 1.

F600
The following section is about your attitude towards new technologies for food production. How far do you agree or disagree with the following statements about food technologies? Please think of new food technologies in general, not about a specific technology. Note: We are aware that responding to these statements might be difficult. Nevertheless, please give an estimation.

		Scale						
		7	6	5	4	3	2	1
Code 1	New food technologies decrease the natural quality of food.							
Code 2	Society should not depend heavily on technologies to solve its food problems.							
Code 3	New food technologies may have long term negative environmental effects.							
Code 4	New food technologies are unlikely to have long term negative health effects.							

Scale: 7 = I fully agree, 4 = I neither agree nor disagree, 1 = I fully disagree

F700
Finally, we have some personal questions. Please be aware that we will treat all information you give us strictly confidential. Please press ">" to continue.

F710	
Are you full-time, part-time or not employed or retired?	Code
0%	1
Less than 50%	2
50 – 89%	3
More than 90%	4

F720
How many people live in your household (including you)?: _____

F750S (only Swiss sample)	
What is currently your highest educational achievement?	Code
No school-leaving qualification	1
Obligatory school (secondary school)	2
10. Schuljahr, *Vorlehre* or equivalent education	3
Fachmittelschule or equivalent education, 2 to 3 years	4
Berufliche Grundbildung (e.g. apprenticeship, commercial diploma)	5
High school Matura, *Lehrkräfte-Seminar*	6
Vocational school-leaving certificate	7

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

Federal vocational certificate, diploma or *Meisterdiplom*	8
Higher vocational school	9
Bachelor (university, university of applied sciences)	10
Master, licentiate, Diploma, state examination, postgraduate (university, university of applied sciences)	11
Doctorate, habilitation	12
Different qualification	88
Prefer not to answer	99

F750D (only German sample)	
What is currently your highest educational achievement?	Code
No school-leaving qualification	1
Elementary school	2
Hauptschulabschluss	3
Secondary school certificate	4
Apprenticeship	5
High school certificate	6
Apprenticeship after high school	7
Bachelor	8
Master/Diploma/State Examination	9
PhD/Doctorate	10
Different qualification	88
Prefer not to answer	99

F760S (only Swiss sample)	
What is your monthly household gross income?	Code
Less than CHF 2,000	1
CHF 2,001 – CHF 4,000	2
CHF 4,001 – CHF 6,000	3
CHF 6,001 – CHF 8,000	4
CHF 8,001 – CHF 10,000	5
CHF 10,001 – CHF 15,000	6
CHF 15,001 – CHF 20,000	7
CHF 20,001 – CHF 25,000	8
More than CHF 25,000	9
Prefer not to answer	99

F760D (only German sample)	
In which of the following categories would you enter your household's monthly net income (monthly income of all people living in the household less taxes and social contributions)?	Code
Up to 1,000 €	1
1,001 – 1,500 €	2
1,501 – 2,000 €	3
2,001 – 2,500 €	4
2,501 – 3,000 €	5
3,001 – 3,500 €	6

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION

3,501 – 4,000 €	7
4,001 – 4,500 €	8
4,501 – 6,000 €	9
6,001 – 7,500 €	10
7,501 – 9,000 €	11
9,001 – 12,000 €	12
More than 12,000 €	13
Prefer not to answer	99

CORE organic

PRO-ORG COORDINATOR CREA (ITALY)

THE AUTHOR(S)/EDITOR(S) ACKNOWLEDGE THE FINANCIAL SUPPORT FOR THIS PROJECT PROVIDED BY TRANSNATIONAL FUNDING BODIES, BEING PARTNERS OF THE H2020 ERA-NET PROJECT, CORE ORGANIC COFUND & THE COFUND FROM THE EUROPEAN COMMISSION