Market study on date marking and other information provided on food labels and food waste prevention

Annexes to Final Report

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Annex 1 Desk research: food waste profiling

Food waste profiles[1] are needed to provide insights into which food products are most wasted by supply chain stage and MS. The information they provide is essential to establishing a case for reform and in the evaluation of policy options that are intended to prevent waste. When exploring the links between date marks and food waste, having the breakdown by product category is not necessarily sufficient. It is also helpful to have data that distinguish food product types by reference to:

- the food temperature at which the food was maintained before it was discarded (frozen, chilled, ambient);
- whether the food is retailed in a packaged or loose form (or via food service wholesale); and
- the nature of the date codes and any on-pack consumer advice that appears alongside the codes.

Unfortunately much of this detail cannot be readily ascertained from compositional studies of consumer food waste as the food waste usually cannot be linked to its original packaging. For the purposes of this review, the ideal requirements had to be balanced against what was possible within the limitations of existing datasets and the constraints of underlying measurement techniques.

All relevant food waste data were assessed. The best resource identified was a set of data on EU-28 food waste that were recently compiled for an EU-funded research project called FUSIONS ("Food Use for Social Innovation by Optimising Waste Prevention Strategies"). Additional data that were published since the FUSIONS work was completed have also been considered.

1.1 Review of EU-28 food waste datasets

1.1.1 Introduction

Food waste datasets for the 28 Member States (MS) of the EU (EU-28) were reviewed by FUSIONS. These datasets were used to support the development of estimates of the quantity of food waste produced in Europe that were published in 2016 (European Commission (FP7), Coordination and Support Action, FUSIONS, 2016b). The estimates quantified total food waste for the 28 Member States, across five life cycle stages (termed 'sectors' within the FUSIONS report). The current study accessed these datasets from country reports found on the FUSIONS website. Supplementary data from additional data sources published since FUSIONS have also been included.

FUSIONS collated the estimates from information provided by individual Member States in response to a request that solicited data on the:

1. The amounts of food waste generated from different sectors in the food value chain
2. The destination of this food waste (e.g. whether going to landfill, anaerobic digestion)
3. The amount of food waste split into different product categories.

The primary data collected by FUSIONS were derived from national sources and from individual research studies. These were assessed for their robustness and adjusted to conform to the common definitional framework developed by the FUSIONS project

[1] A food waste profile is a set of categories used to define food waste composition. As such, it may reflect different research priorities of those commissioning the analysis, for example these may base categories on food products, class of nutrition (e.g. carbohydrates, proteins, fat), edibility, the extent to which waste is avoidable, or combinations of these elements.

(European Commission (FP7), Coordination and Support Action, FUSIONS, 2015). The data that were gathered mainly related to 2012 or earlier.

FUSIONS estimated that the EU-28 produce 87.6 million tonnes of food waste per year (Table A1.1), and that this food has a value of 143 billion euros. It further explained that: "The household sector contributes the most to EU food waste (46.5 million tonnes), with 70% of EU food waste arising at household, food service and retail. These sectors are relevant to UN Sustainable Development Goal 12.3 which targets a 50% reduction in food waste at the retail and consumer levels, in addition to reducing food losses along production and supply chains by 2030. The production and processing sectors contribute to the remaining 30% of EU food waste." (EU FUSIONS website)[2].

Table A1.1 FUSIONS estimates of EU 28 food waste by sector

EU 28:	Food waste (Million tonnes)
Primary production	9.1
Processing/ manufacture	16.9
Retail/ distribution	4.6
Food service	10.5
Households	46.5
Total	**87.6**

Source: European Commission (FP7), Coordination and Support Action (2016b)

1.1.2 FUSIONS: extrapolation used in EU28 estimates

Where there were gaps for individual Member States, FUSIONS estimates were developed based on data of sufficient quality from other Member States for the equivalent stage(s) of the supply chain.

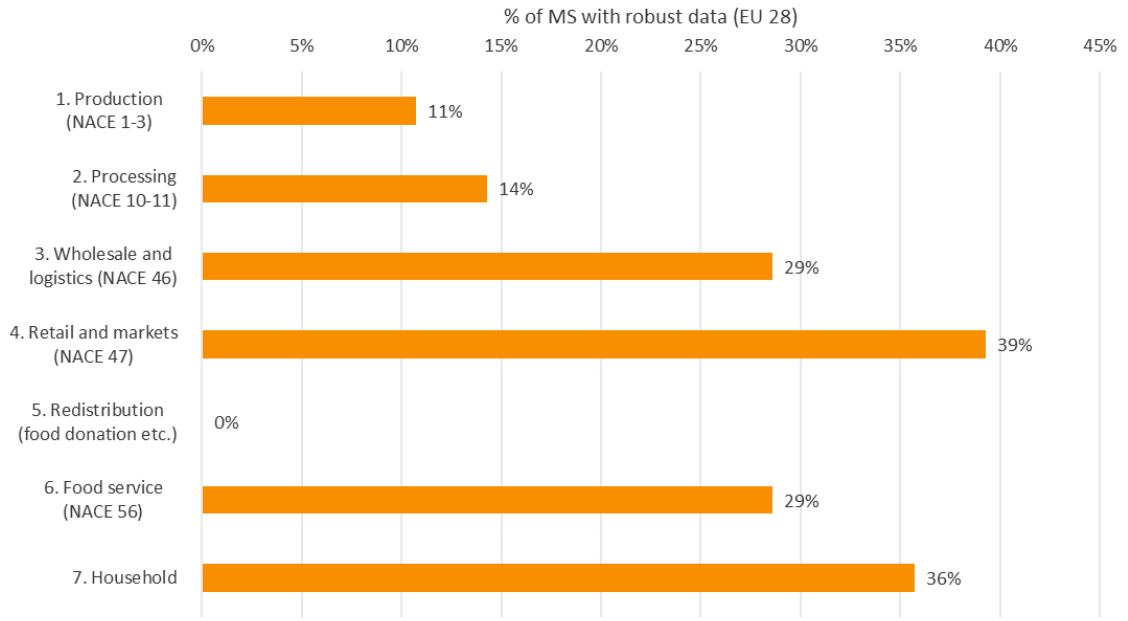
The availability of sufficiently robust primary data sources varied significantly by sector/ supply chain stage. Retail was the best represented (39% of Member States). Food redistribution was not represented by any MS data (Figure A1.1 and Table A1.2).

Details of all the data received were reported to FUSIONS in the form of country summaries and spreadsheets. Although the more detailed data were not used in the estimation process (only total estimates were published), FUSIONS provided an inventory of underlying datasets that included food product categories. These data are reviewed in Section 1.3.

In the matrix of 196 cells of sectors and Member States in Table A1.2, 43 (22%) were judged to be sufficiently robust to be used in extrapolation. Northern European Member States were generally better represented within this group than Member States from other regions.

[2] A 'Food Waste Quantification Manual' was published alongside these new estimates (EC FP7 2016a). The manual facilitates collection of reliable food waste data and reporting in EU-28.

Figure A1.1 Proportion of EU 28 member states with sufficiently robust food waste estimates by sector



Source: European Commission (FP7), Coordination and Support Action (2015)

Table A1.2 Food waste datasets judged to be of sufficient quality to contribute towards EU28 estimates

Country	Production (NACE 1-3)	Processing (NACE 10-11)	Wholesale and logistics (NACE 46)	Retail and markets (NACE 47)	Redistribution (food donation etc.)	Food service (NACE 56)	Household
Austria				X		X	X
Belgium							
Bulgaria							
Croatia							
Cyprus							
Czech republic							
Denmark	X		X			X	
Estonia			X	X			X
Finland						X	X
France		X				X	
Germany	X	X	X	X		X	X
Greece			X	X			
Hungary							
Ireland						X	X
Italy	X		X	X			
Latvia							
Lithuania		X					
Luxembourg			X	X			X
Malta							X
Netherlands				X			X
Poland							
Portugal							
Romania							
Slovakia							
Slovenia			X	X			
Spain							
Sweden				X		X	X
United Kingdom		X	X	X		X	X

Source: European Commission (FP7), Coordination and Support Action (2015)

1.2 Generating more detailed food waste profiles through adapting EU-28 datasets

The study team assessed available EU-28 food waste datasets to determine their potential to support development of more detailed food waste profiles. This involved:

- A review of factors that had been used by FUSIONS in developing estimates at the EU-28 level ("normalisation factors") and the potential to adapt these for detailed food waste profiling by food types/ products (Section 1.2.1)
- A detailed assessment of underlying datasets at country level, relating to reported splits of food waste by product category (Section 1.2.2)

1.2.1 Review of the factors used in FUSIONS estimates

Table A1.3 provides a summary of the normalisation factors that that had been used by FUSIONS to scale up food waste estimates to the EU-28 level.

Table A1.3 Original normalisation factors used for filling missing data

Sector / supply chain stage	Normalisation factors used to scale to EU28, filling gaps for MS missing robust data	Implications for generation of 'food waste profiles' in this current study
Production (NACE[3] 1-3)	Agricultural production: kg/tonnes food produced; applied to MS agricultural production total	Out of scope of the current study.
Processing (NACE 10-11)	Manufacturing output: kg/tonnes output from manufacture; applied to MS manufacturing total	Generation of food waste profiles that relate to different MS food manufacture profiles; more detailed estimates will need to differentiate manufacture of different food product categories.
Wholesale and logistics/ distribution (NACE 46)	Population: kg per capita	Single factor applied by FUSIONS study; later it was combined with retail within final FUSIONS estimates
Retail and markets (NACE 47)	Population: kg per capita	Single factor applied.by FUSIONS study (More detailed estimates would need to differentiate different food products wasted and different profiles of food available at the retail stage by MS.)
Redistribution (food donation etc., no NACE code)	Not estimated by FUSIONS	Although this was dealt with separately by the FUSIONS study it may be more easily considered within each separate sector and estimated in relation to their respective production/ turnover.
Food service (NACE 56)	Turnover: kg/ turnover value, corrected for purchasing power parity across EU	Need to differentiate by food product type and to reflect differences in food consumed out of home in different MS.
Household (no NACE code)	Population: kg per capita	Need to differentiate by food product type and to reflect differences in food consumed at home in different MS.

Source: ICF, based on European Commission (FP7), Coordination and Support Action (2016b)

[3] « Nomenclature statistique des Activités économiques dans la Communauté Européenne » : Statistical classification of the economic activities in the European Community

1.2.2 Review of country food waste compositional profiles

Methodology

The data received by FUSIONS and the categories used by the different Member States and sectors to describe the composition of food waste were reviewed for the current study. This review informed an assessment of whether it would be possible to combine datasets to help in the development of detailed food waste profiles.

The study team also cross-referenced these data sources to the sources that were judged by the FUSIONS project to be sufficiently robust to contribute factors to the scaling of total food waste to the EU-28 level (Table A1.2).

The study team encountered issues with data coverage, particularly in relation to the inclusion of liquid food waste within the underlying studies on which estimates were based. Drink and other liquid products are not often represented in consumer or food service food waste studies due to the research challenges of capturing information on liquids poured down the drain.

The FUSIONS request asked for data to be reported by reference to the following 16 food categories:

1. Dairy products
2. Fats and oils, oil-based products
3. Ice cream, sorbets, etc.
4. Fruits and vegetables, including nuts and seeds
5. Confectionery
6. Cereals and cereal products
7. Bakery wares
8. Meat and meat products, including game
9. Fish and fish products, including molluscs and crustaceans
10. Eggs and egg products
11. Sweeteners, including honey
12. Salt, spices, soups etc.
13. Food stuff [category not explained within the original source]
14. Beverages, excluding dairy products
15. Ready to eat food
16. Composite food not possible to include in other groups

Availability of food waste profiles by sector and country

The availability of data varied by Member States and by sector, as shown in Table A1.4.

Table A1.4 Availability of detailed food waste profiles across EU 28

Member State	Processing (NACE 10-11)	Retail & markets (NACE 47)	Food service (NACE 56)	Households
Austria				■
Belgium				
Bulgaria				
Croatia				
Cyprus				
Czech Republic				
Denmark	■	■		■
Estonia				
Finland	■			■
France				■
Germany				■
Greece				■
Hungary				
Ireland				
Italy	■			■
Latvia				
Lithuania				
Luxembourg				
Malta				
Netherlands		■		■
Poland				
Portugal				
Romania				
Slovakia				
Slovenia				
Spain				■
Sweden				■
United Kingdom	■	■	■	■

Note: Green shading indicates availability of detailed waste profiles

Source: ICF, based on European Commission (FP7), Coordination and Support Action (2015) and WRAP (2013f, 2016a)

The situation for data by sector was as follows:

- *Manufacturing* – six countries were able to supply data for manufacturing. These comprised **four Member States** (**Denmark** (Miljøministeriet, 2010; Mogensen, L., et al., 2011), **Finland** (Silvennoinen, K. and Korhonen, O., 2013), **Italy** (Barilla Center for Food & Nutrition; 2012; WWF, 2013), **United Kingdom** (WRAP, 2013a)), **plus Norway** (Østfoldforskning, 2013) **and Turkey** (FAO, 2013a).
- *Retail/ distribution* – five countries had retail/distribution data. These comprised **three Member States** (**Denmark** (Mogensen, L., et al., 2011), **Netherlands** (CREM, 2013; Milieu Centraal, Voedings Centrum, 2013; Soethoudt, H. and Timmermans, T., 2013), **United Kingdom** (WRAP, 2013a)) **plus Norway** (Østfoldforskning, 2013) **and Turkey** (FAO, 2013a).
- *Food service* – **only the United Kingdom** (WRAP, 2013f) had detailed food waste profiling data for the food service sector.
- *Households* – 13 countries had household data. Of these there were **11 Member States** (**Austria** (Federal Ministry of Agriculture, 2012; Lebsorger S. et al., 2014; Lebsorger S. et al., 2011; Schneider, F., 2013; Salhofer S. et al., 2008), **Denmark** (Miljøministeriet, 2010; Mogensen, L., et al., 2011), **Finland** (Silvennoinen, K. and Korhonen, O., 2013), **France** (ADEME, 2014; Ministère de l'Écologie, du Développement durable et de l'Énergie, 2012), **Germany** (BMEL, 2012; Priefer, C. and Jörissen, J., 2012), **Greece** (Abeliotis, K. et al, 2014), **Italy** (Barilla Center for Food & Nutrition, 2012; WWF, 2013), **Netherlands** (CREM, 2013; Milieu Centraal, Voedings Centrum, 2013; Soethoudt, H. and Timmermans, T., 2013), **Spain** (Ministerio De Agricultura, 2015), **Sweden** (Andersson, T., 2012; Institutet för Livsmedel och Bioteknik (SIK), 2013; Naturvårdsverket (Environmental Protection Agency), 2014), and the **United Kingdom** (WRAP, 2013a)) **plus Norway** (Østfoldforskning, 2013) and **Turkey** (FAO, 2013a).

The country findings regarding food product type are described below by sector:

- *Manufacturing data* – **Denmark** had the best product data, The following 14 food product categories were included (Miljøministeriet, 2010; Mogensen, L., et al., 2011):

  - Milk and dairy products
  - Cheese and cheese products
  - Bread, rice and pasta
  - Vegetables
  - Potatoes
  - Fruit and juice
  - Beef
  - Pork
  - Fish
  - Poultry
  - Egg
  - Fatty products
  - Sugar and sweets
  - Beverages

  The United Kingdom has the most comprehensive data in terms of coverage of different processing / manufacturing sectors and consideration of liquid food wastes within on-site treatment sludges and wash water (WRAP, 2016a)(published after the FUSIONS review).

Gaps in the manufacturing data: Some countries supplied breakdowns for manufacturing but with gaps in their coverage. Finland (Silvennoinen, K. and Korhonen, O., 2013), Norway (Østfoldforskning, 2013) and Turkey (FAO, 2013a) all had gaps in beverages. Finland also had a gap for fruits and vegetables, but these may have been included in 'Other', which accounted for 31%. Within the waste generated by manufacture of food, it is not possible to differentiate packaged product, waste from 'work in progress', and rejected inputs to processes unless detailed waste audits are conducted alongside the collation of food waste tonnage data. The lack of such detailed audit data limits the possibilities of identifying the role of date marks in food rejected within the sector.

- *Retail Data* – **Denmark** (Miljøministeriet, 2010) had the best product breakdown for the retail sector within the datasets collated by FUSIONS (following the same categories as manufacture, as stated above). **Norway** (Østfoldforskning, 2013) (not within the scope of this current study) provided a similarly detailed breakdown by product categories. The data collected by FUSIONS pre-dated most detailed retail datasets used in the 2016 **UK** (WRAP, 2016a) study of the grocery supply chain. These were based on a bottom-up approach to compiling estimates from the scanning of unsold food products and are described in Section 3.2. As the information is recorded at store, it is possible to relate food waste to whether or not the products were packaged and to the main reasons for the food becoming waste.

  Gaps in the retail data: Within the other available European data on retail food waste there were gaps in the coverage of drinks products in data from **Netherlands** (CREM, 2013; Milieu Centraal, Voedings Centrum, 2013; Soethoudt, H. and Timmermans, T., 2013), **Norway** (Østfoldforskning, 2013) **and Turkey** (FAO, 2013a). These were likely excluded from the supporting studies as the 'other foods' was not a large category within any of these studies.

- *Food Service* – The only detailed food waste profile for the food service sector was that used for the 2013 **UK** study. This had coverage of nine different food service sectors (pubs, restaurants, quick service restaurants, hotels, healthcare, staff catering, education, services and leisure), the measurement of 'down the drain' drinks and liquid foods and used the following food waste profile by product type (WRAP, 2013a):

  - Potato/ potato products
  - Fruit and vegetables
  - Bread and bakery
  - Meat and fish
  - Pasta and rice
  - Dairy and eggs
  - Drinks/ liquids

- *Household Data* – The **UK** provided the most comprehensive household product breakdown in relation to household food waste (WRAP, 2013a; WRAP, 2013b; WRAP, 2014a): Due to the nature of waste compositional analysis conducted on household food and drink waste, the samples taken from waste bins cannot be directly linked to whether or not the original purchased products were packaged, nor to the nature of any date labels applied. The different approaches used to aid understanding of the links between food waste and date labelling issues are reviewed in Section 2.2 of the main report.

The product categories used by WRAP were:

Apple	Citrus fruit	Onion / leek
Banana	Cooking sauce	Pasta
Bean (all varieties)	Cream and crème fraiche	Pear
Beef	Cucumber	Pork
Bottled water	Egg	Poultry
Bread	Fat	Processed potato
Breakfast cereal	Fish	Rice
Cabbage	Fresh potato	Savoury snacks
Cakes	Fruit juice and smoothies	Soft / berry fruit
Carbonated soft drink	Lager, beer and cider	Squash
Carrot	Lamb	Stone fruit
Cauliflower	Lettuce / leafy salads	Tea waste
Cereal bars and sweet biscuits	Melon	Tomato
Cheese	Milk	Wine
Chocolate and sweets	Mushroom	Yoghurt

Gaps in the household data: **Finland** (Silvennoinen, K. and Korhonen, O., 2013), Greece (Abeliotis, K. et al, 2014) and **Italy** (Barilla Center for Food & Nutrition, 2012; WWF, 2013) all had gaps in Drinks. All countries are most likely to have excluded drinks from their data collection as inclusion of this aspect is a more complex and expensive undertaking.

1.3 Conclusions

The review conducted for this study determined that it was not possible to develop a consistent set of food waste profiles detailed to food product level for the EU-28 and by sector because of issues with the availability and consistency of data. (There is wide variation in the different food waste profiles used to classify food waste by food product types across the 11 Member States for which such data were available for one or more sectors (Table A1.4). None of the food waste profiles conformed to the ideal 16 element food product categories suggested in the FUSIONS reporting forms.)

The datasets that were identified by FUSIONS as robust (Table A1.2) for the purposes of estimating EU-28 total food waste did not all have a detailed breakdown for the underlying food products (Table A1.4). Disaggregation of food waste data by product category was commonly reported only at household level (for 11 Member States). Drink waste was a significant gap in food service and household food waste profiles across the EU-28 (exceptions being UK food service and household food waste data, and household food waste data from Sweden). Only two Member States (Germany and UK) had estimates for total food waste for each life cycle stage (Table A1.2). Only the UK provided detailed food waste profiles for each (Table A1.4).

No common data collection standard or process was used at the time at which the data were compiled. The approach taken to food waste profiling is mostly unique to each Member State. Food waste is not consistently reported at the EU level and many of the data sources that are available pre-date the efforts of the FUSIONS project to standardise definitions and methodologies.

Standardising the food product categories used to describe food waste across different supply chain stages is problematic. Confounding factors include data collection techniques and the extent to which the life cycle stage relates to final product, food processing, or a mix of discarded food and unopened packaged product.

The FUSIONS food waste profiles were originally collated to provide a breakdown of estimates of total food waste by Member State. They were not included in the final EU-28 food waste total estimates, for the reasons identified in this review (i.e. it is difficult to combine the available datasets into consistent groupings). Analysis of this kind that was undertaken for the current study resulted in only six food product categories that could be consistently applied across Member States and sector.

Given these challenges, an alternative approach was needed for this study. The solution adopted is presented in the next section. It uses existing EU-28 food waste estimates but also makes use of supplementary data sources to build the waste profiles required.

1.4 Methodologies to develop detailed food waste profiles

This annex describes the approach taken to development of a consistent set of food product category profiles for existing EU food waste estimates, by MS and sector.

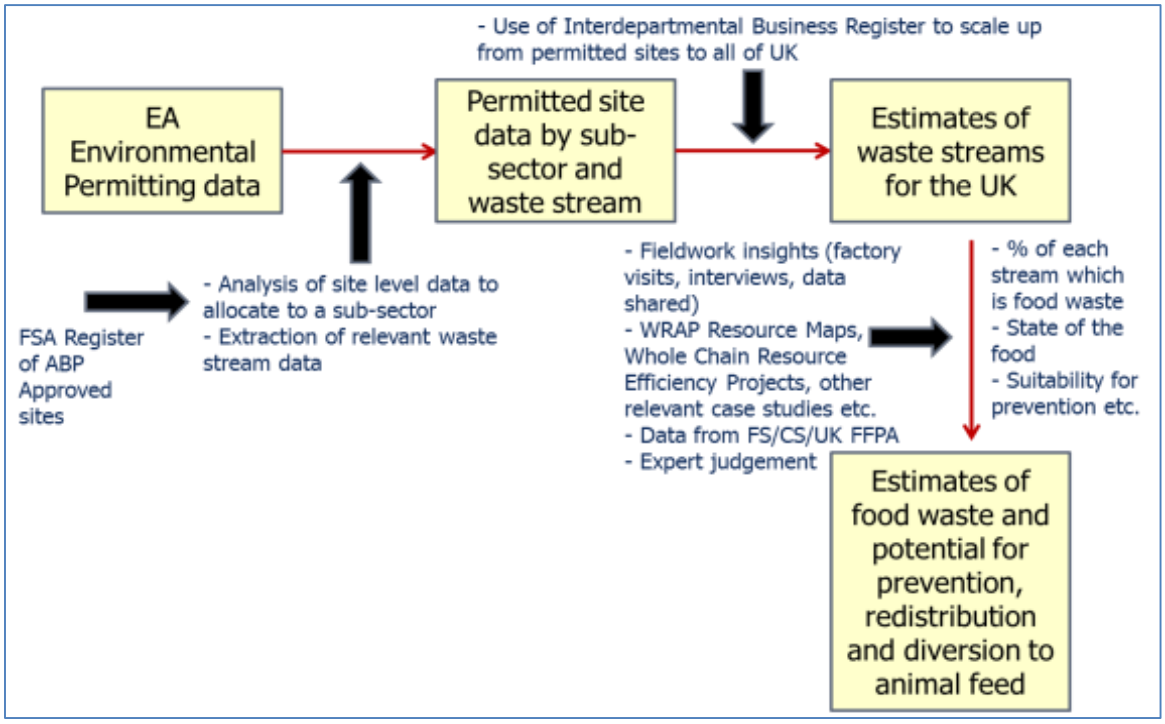
The food waste data reviewed discussed in the previous section showed that development of detailed food waste profiles would require use of new data sources. The text below describes the solution developed for each sector, and a summary of the strengths and weaknesses of the approach taken. In general, the methodologies are informed by a combination of food waste studies published since March 2016, some of the sources included within the FUSIONS review, and by official statistics relating to food production and food availability. The research team considered the availability and suitability of EU-28 datasets relating to each of the main waste sectors: food production/ availability, retail and food service food procurement and sales and household food purchases and consumption.

1.4.1 Manufacturing/ processing sector

2016 WRAP published a detailed assessment of manufacturing food and drink waste at industry sub-sector level, broadly equivalent to food product categories for the UK (WRAP, 2016a). This had combined regulatory datasets with site audits, interviews and findings from a variety of sector specific research projects on resource mapping and whole supply chain resource efficiency reviews (Figure A1.2). It formed the basis of a method for mapping food waste within the sector used in the FUSIONS manual (European Commission (FP7), Coordination and Support Action, FUSIONS, 2016a).

The strength of this approach is that combines a variety of different data sources, including site visits and assessment of different disposal routes and waste prevention potential. The audit work and other evidence gathering was used to differentiate 'avoidable' from 'unavoidable' food waste, approximately equivalent to edible and inedible parts within the FUSIONS definition of food waste.

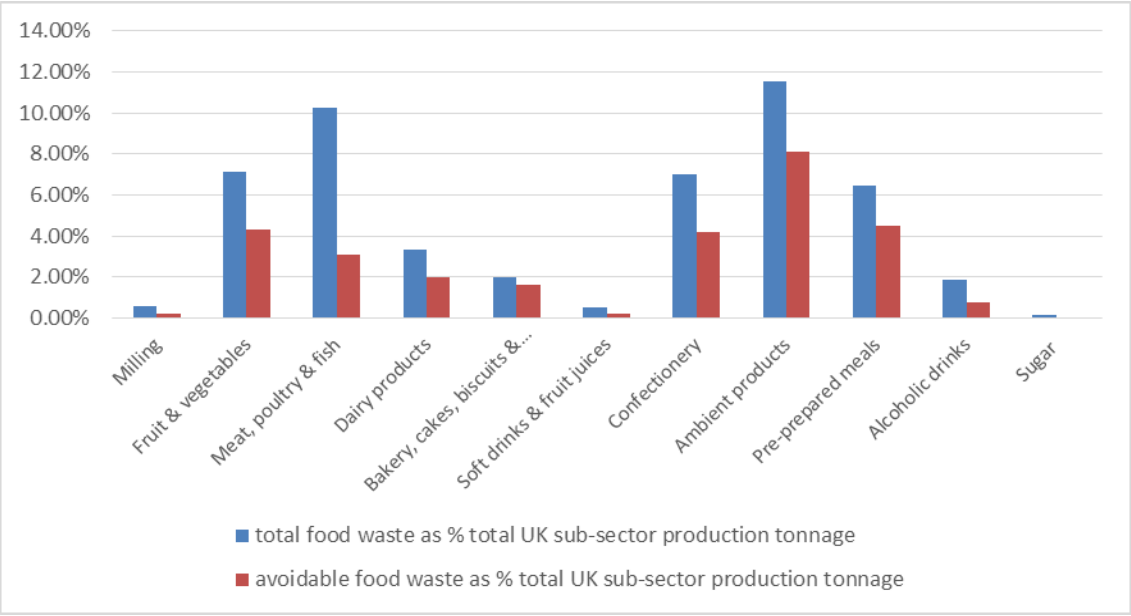
Figure A1.2 Approach to deriving estimates for manufacturing food waste)



Source: Waste and Resources Action Programme (WRAP) (2016a)

A methodology for detailing food waste by product category for manufacturing was developed by the study team by linking total food waste by sub-sector, from WRAP 2016 findings, with data on food production from "PRODCOM"[4]. (See Figure A1.3.)

Figure A1.3 Food/ drink manufacturing food and drink waste (total and avoidable as a proportion of UK food and drink manufacturing production; tonnes)



Source: Waste and Resources Action Programme (WRAP) (2016a)

[4] ("PRODuction COMmunautaire" (Community Production) statistics on the production of manufactured goods)

PRODCOM provides statistics on manufactured goods arranged by NACE codes relating to type of economic activity (the first 4 digits of more detailed product-specific codes). This provided a method for splitting the FUSIONS estimates into production related food waste for different NACE groupings (Table A1.5). PRODCOM data were used for each Member State. Waste factors per tonne of production derived from WRAP 2016 were then applied.

Table A1.5 Allocation of NACE codes to manufacture/ processing subsectors

Industry sub-sector	NACE codes	Notes
Fruit and vegetables	NACE 10.3, excluding 10.3.2	
Meat, fish and poultry	NACE 10.1 and 10.2	
Dairy	NACE 10.5	
Ambient products	NACE 10.8	
Bakery	NACE 10.7	
Pre-prepared	NACE 10.8.5	
Juices and other drinks	NACE 11.0.7, 10.3.2	Fruit/ vegetable juices allocated here, rather than within 10.3
Alcoholic drinks	NACE 11.0.1, 11.0.2, 11.0.3, 11.0.4,11.0.5,11.0.6	
Confectionery	NACE 10.8.2, 10.8.1	Includes sugar industry
Milling	NACE 10.7	

Source: ICF

The use of waste per tonne of production as a proxy factor for MS manufacturing food waste is likely to correlate with real differences in waste arisings. However, the use of UK derived factors to extrapolate across the EU-28 is heavily caveated by the fact that it does not capture differences between Member States in resource efficiency at the production stage. Resource efficiency will be linked to a range of regional and MS influences, such as the extent to which waste is avoided by valorisation options more widely available in some countries than others, food surplus redistribution policies, adoption of lean technologies and differences in regulatory efficiencies and enforcement. However, a number of the largest food businesses included within the WRAP 2016 study also operate across a number of other EU-28 countries.

1.4.2 Retail

The most detailed food waste datasets are found within the retail sector. This is the point in the supply chain where the association between product type and food waste is strongest. This is because food waste is almost exclusively finished product (packaged or loose). In the manufacturing stage food waste includes losses from work in progress, rejected inputs to production, treatment residues. At the consumer stage uneaten food is mixed with other discards and only a minority of food waste relates to identifiable packaged product.

There are few detailed datasets in the public domain on retail food waste that are based on Stock Keeping Units (SKUs). This partly reflects a lack of investment by retailers in ways of adapting stock inventory systems to collect POS (Point Of Sale) information on food waste. For the few retailers that do have such systems, commercial confidentiality concerns limit access to the datasets (although the study published by WRAP in 2016 did include an aggregated analysis of such data for three UK supermarkets).

SKU level datasets referenced in the WRAP 2016 study provide the most detailed picture available of retail food waste by product. This includes the relationship between wasted product and total quantity sold. The sales (or food availability) data was analysed to derive a proxy variable to profile retail food waste based on food availability statistics for each MS. The more detailed retail food waste data also permit in-situ recording of the main reason for loss as part. This is usually recorded as being either due to date mark expiry or to product quality issues or damage. Detail can be extracted on product types (Table A1.7), including the nature of any date labels (best before, use by), the relative contributions of 'date expiry' and 'product damage/ quality' issues as the reason for the product becoming waste. For products sold loose, the systems cannot generate food waste quantities based on standard product weight: instead an assessment is needed to provide average weights per item.

Variation in the profile of food products sold within the European retail grocery sector will have an influence on the types of food waste (as will other factors such as the nature of the supply chain and local variants in food sourcing and local / regional produce). Consistent data for profiled food categories at the retail stage were used to generate profiles of food wastage based on the more detailed picture provided by the UK analysis. These were obtained from the Food and Agriculture Organization of the United Nations ("FAO") Food Balance Sheet data on per capita food supply (FAOSTAT, 2011c). These data are expressed in food raw material equivalents and therefore have to be converted to the weight of processed / final product to achieve a link with food product at the retail stage (Figure A1.4). The FAO Food Balance Sheet data (FAOSTAT, 2011c) were converted to final product weights using conversion factors derived from the UK Department of Environment, Food and Rural Affairs ("Defra") Family Food Survey 2014 (Defra, 2014). This conversion was achieved by using data on final product consumption from the Defra household food product survey results. The overall scheme for performing these estimates is shown in Figure A1.5, with a worked example provided below.

Although this methodology provides differentiated food product categories by MS, it does not take account of the differences between the UK retail sector and that of other Member States. This is because the same wastage rates are applied to each food product category and the method is only able to vary the mix of food products available at the retail stage via the FAO data. There is likely to be significant variation in relation to fresh fruit and vegetables, particularly between southern and northern European countries. The use of more local sourcing and the sale of loose / unpackaged product may result in significantly different wastage rates but no primary data were found to inform such differences.

Table A1.6 Categories used to group FAO data and link with retail / distribution

Food product categories
Fresh fruit and vegetables
Meat
Dairy
Ambient products
Bakery
Pre-prepared meals
Juices and other drinks
Alcoholic drinks
Confectionery

Source: ICF

Table A1.7 UK retail food waste, proportion (in percentages) with or without date label and indicative proportion (in percentages) of waste within retailer food category due to date expiry

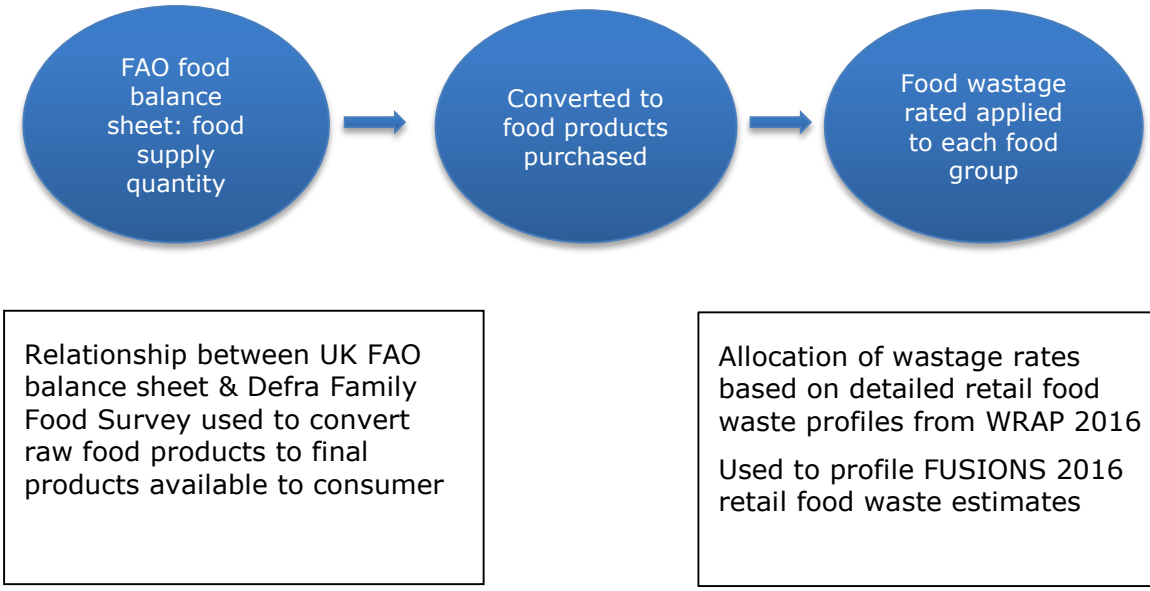
	Product category	% total retail food waste		Typical date marks applied	% retail food waste due to date expiry
		With date	No date		
Bakery	Bread : sliced / packaged	4.9%	0.0%	"best before"	88.0%
	Morning goods : packaged	2.7%	0.0%	"best before"	
	Cakes : packaged	1.5%	0.0%	"best before"	
	Cakes : fresh	0.0%	0.1%	sold fresh on day	
	Morning goods : fresh	0.0%	17.5%	sold fresh on day	
	Bread : fresh	0.0%	15.1%	sold fresh on day	
Counters	Other meats: processed/ packaged	0.0%	0.0%	"use by"	45.0%
	Delicatessen counters (cured/ processed meats, loose cheeses, savouries, others)	0.0%	2.3%	"use by"	
Fresh produce	Fresh fruit	11.4%	0.4%	no date or "best before"	40.0%
	Fresh vegetables	7.5%	0.6%	no date or "best before"	
	Pre-prepared fresh fruit and vegetables	3.7%	0.0%	"use by"	
	Fresh salad/ leaf	3.0%	0.0%	"best before"	
	Organic fruit/ vegetables	0.6%	0.0%	no date or "best before"	
	Soups : chilled	0.1%	0.0%	"use by"	
Meat	Meat: fresh	1.2%	0.3%	"use by"	38.0%
	Meat: chilled/ packaged	1.2%	0.0%	"use by"	
	Poultry: fresh	1.0%	0.0%	"use by"	
	Fresh fish	0.5%	0.3%	"use by" / no date	

	Product category	% total retail food waste		Typical date marks applied	% retail food waste due to date expiry
		With date	No date		
Dairy	Dairy: pre-pack cheeses/butter/ milk	6.2%	0.0%	"use by" or "best before"	33.0%
	Dairy: yoghurt/ dairy desserts	1.9%	0.0%	"use by" (e.g. milk) or "best before"	
Soft drinks	Soft drinks	4.3%	0.0%	"best before"	28.0%
Frozen	Frozen vegetables	0.9%	0.0%	"best before"	10.0%
	Frozen foods: other	1.4%	0.0%	"best before"	
	Frozen pizza	0.1%	0.0%	"best before"	
	Frozen pre-prepared meals	0.1%	0.0%	"best before"	
	Frozen meat products	0.3%	0.0%	"best before"	
	Frozen fish	0.2%	0.0%	"best before"	
	Ice cream	0.6%	0.0%	"best before"	
	Frozen confectionery	0.2%	0.0%	"best before"	
Ambient	Breakfast cereals	0.3%	0.0%	"best before"	8.0%
	Canned / packaged desserts	0.2%	0.0%	"best before"	
	Jams / spreads/ preserves	0.2%	0.0%	"best before"	
	Canned / packaged UHT milk / other	0.4%	0.0%	"best before"	
	Tea/ coffee / other beverages	0.1%	0.0%	"best before"	
	Rice/ pasta	0.7%	0.0%	"best before"	
	Cooking products	0.5%	0.0%	"best before"	
	Crisps / snacks	0.4%	0.0%	"best before"	
	Biscuits	0.3%	0.0%	"best before"	

	Product category	% total retail food waste		Typical date marks applied	% retail food waste due to date expiry
		With date	No date		
	Canned vegetables	0.2%	0.0%	"best before"	
	Baked beans / canned pasta	0.1%	0.0%	"best before"	
	Baby food	0.1%	0.0%	"best before"	
	Canned meat / fish	0.1%	0.0%	"best before"	
	Bottled / canned fruit	0.1%	0.0%	"best before"	
Confectionery	Confectionery	0.6%	0.0%	"best before"	
Alcoholic drinks	Alcoholic drinks	3.4%	0.0%	"best before" / no date	0.1%
Total		**63.5%**	**36.5%**		55.0%

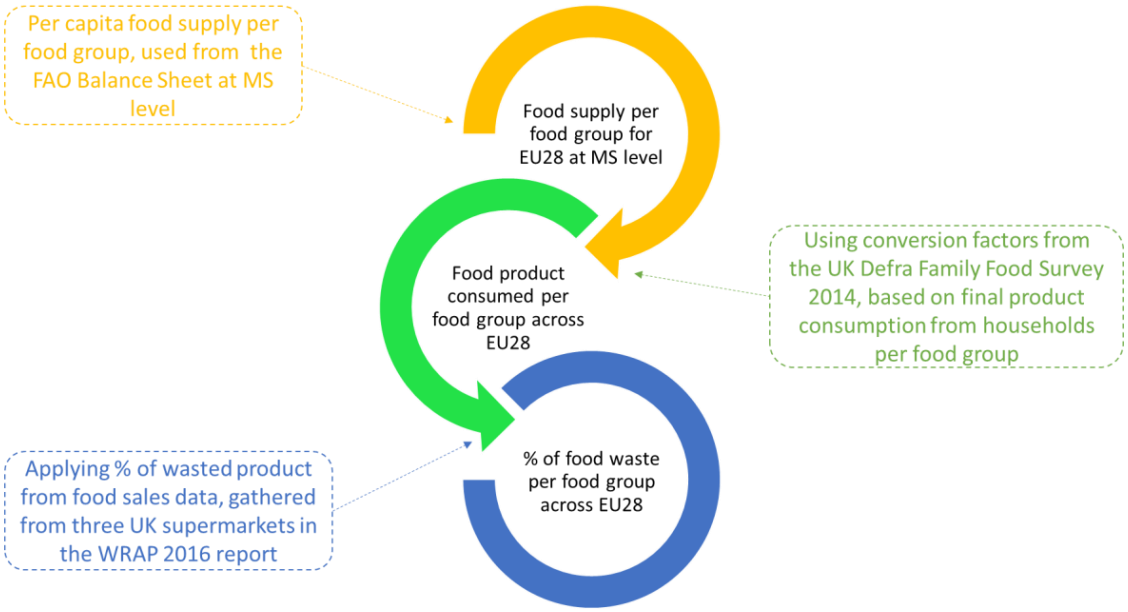
Source: ICF, derived from WRAP (2016a)

Figure A1.4 Retail food waste estimates derived from FAO balance sheet and wastage rates derived from product level retail food waste data



Source: ICF

Figure A1.5 Methodology for retail food waste calculations for product groups



Source: ICF

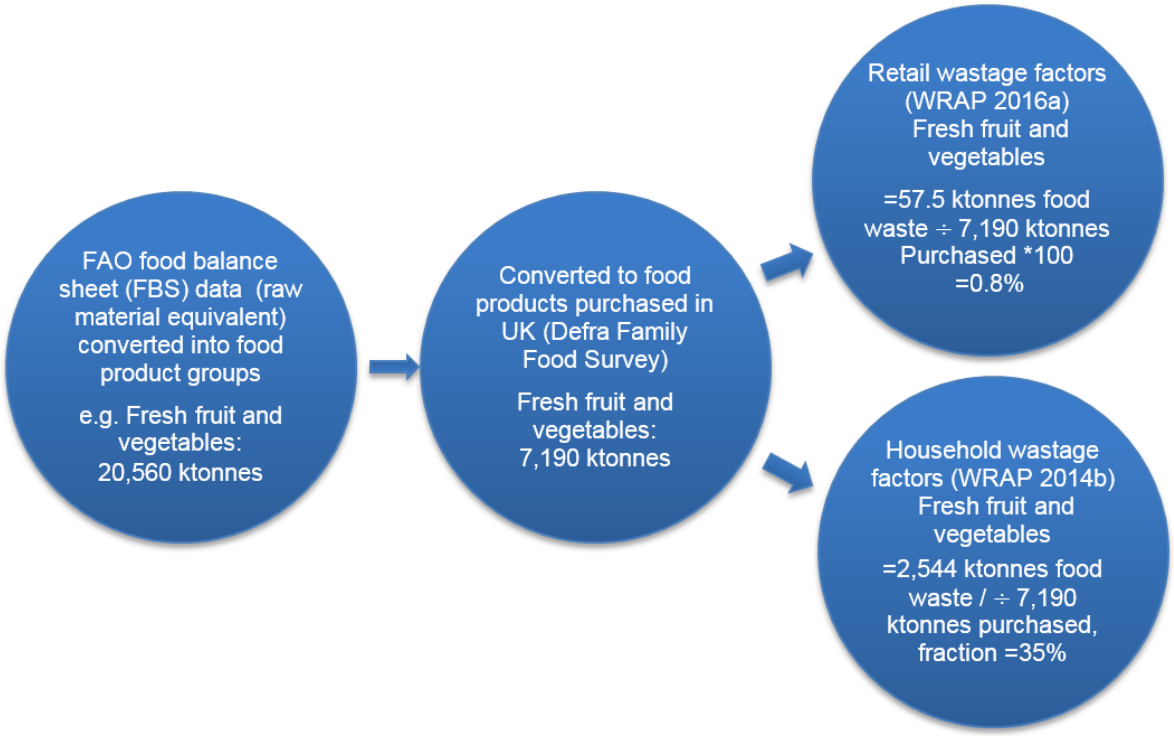
Worked example of conversions from FAO food balance sheet data to food waste estimates

The calculation below provides an example of how FAO Food Balance Sheet data were used in combination with data on food purchased and wastage factors for retail and household food products. The FAO Food Balance Sheet data are expressed in food raw material equivalents and therefore have to be converted to the weight of processed / final product to achieve a link with food product available at the retail stage. In order

to convert the FAO Food Balance Sheet data to final product weights, conversion factors were derived from the UK Defra Family Food Survey 2014.

The example below shows how food wastage factors for fresh fruit and vegetables derived from product focused retail and household food waste studies (WRAP 2014b, 2016a) were then applied to EU-28 MS level food purchasing profiles derived from FAO Food Balance Sheet data.

Figure A1.6 Worked example of conversions from FAO food balance sheet data to food waste estimates



Relationship between UK FAO balance sheet data & Defra Family Food Survey used to convert raw food products to final products purchased by consumers	Allocation of wastage rates based on detailed retail food waste profiles from WRAP 2016 Used to profile FUSIONS 2016 food waste estimates for household and retail sectors e.g. Belgium fresh fruit and vegetables = 1,166 ktonnes purchased (FAO FBS derived) *0.8%= 9.3 ktonnes retail food waste; 35%=410 ktonnes household food waste

1.4.3 Food service

No statistical sources were identified that would profile the quantities of food consumed by different types of food service across EU28. An ideal dataset would show the quantities of food used across a range of different business types, including restaurants, hotels, quick serve restaurants and canteens associated with public institutions and businesses.

The most detailed dataset of this type yet collected was compiled for the WRAP 2013 study (WRAP, 2013f). This identified the main food types and their avoidable and unavoidable types of waste (Table A1.8). The research covered the nine main sub-sectors of UK food service (restaurants, quick serve, pubs, hotels, leisure, transport,

education, staff catering/ canteens, health). It developed a methodology to scale up figures from waste audits to the UK level using official statistics on local business units arranged by NACE code and their size (by number of employees).

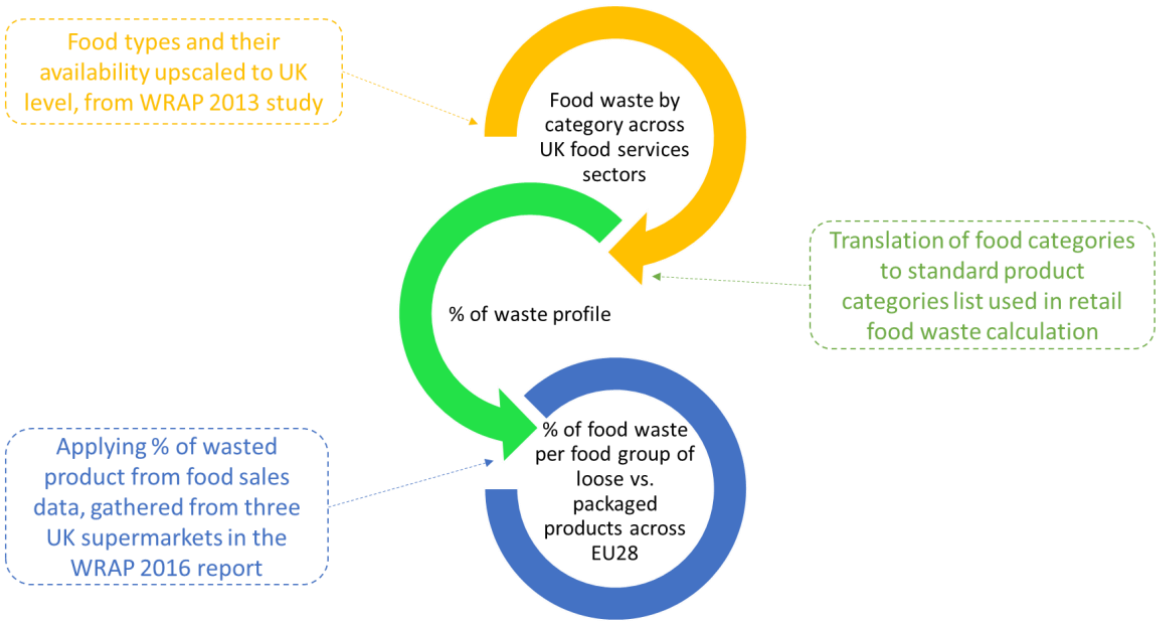
Table A1.8 Food product categories reported within food service sector

Food product categories reported within food service sector	
avoidable potato/ potato products	avoidable liquids
avoidable fruit & veg	avoidable other food waste
avoidable bread and bakery	unavoidable fruit & veg
avoidable inseparable plate scrapings	unavoidable other food waste
avoidable pasta and rice	unavoidable potato/ potato products
avoidable meat and fish	unavoidable meat and fish
avoidable whole servings	unavoidable dairy and eggs
avoidable dairy and eggs	unavoidable inseparable plate scrapings

Source: Waste and Resources Action Programme (WRAP) (2013f)

The categories in Table A1.8 were translated into the standard product category list used for retail food waste (for consistency) to provide a percentage waste profile that was applied to the FUSIONS total food waste estimates. Data from a WRAP 2013 report were used to estimate the proportion of each food category supplied as packaged or loose food product.

Figure A1.7 Methodology for food service sector food waste calculations for product groups



Source: ICF

As the same mix of food service types was assumed across the EU, the profiling produced no variation at the MS level. This is unlikely to be the case, but reflected the limitations of the data sources available.

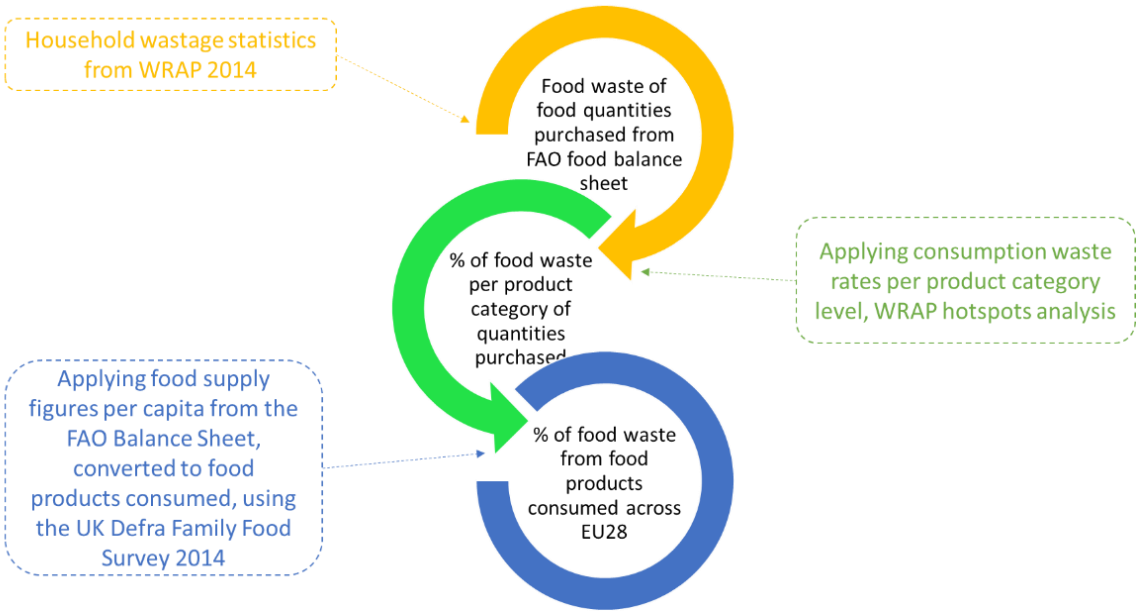
1.4.4 Households

Households was the best represented sector within the EU datasets that provided food waste breakdowns by product category. However, there were too many inconsistencies in the categories supplied for it to be possible to directly apply food waste profiles from FUSIONS to the MS total household food waste statistics (see Section 1.3).

Detailed estimates were instead generated using an approach that was similar to that applied to the retail sector. Food consumption data from the FAO Food Balance Sheet (FAOSTAT, 2011c) were converted to final product weights using conversion factors derived from UK Defra Family Food Survey 2014 (Defra, 2014) data on final product consumption. The converted data (by MS) were used in conjunction with analysis by WRAP that linked product-focused household food waste to quantities of food purchased (WRAP, 2014b). A worked example of the calculation method is given in Figure A1.6.

Although the output produced results that were less detailed than some of those available at MS level, the categories are consistent with those used at earlier stages in the food chain and across Member States (Table A1.6).

Figure A1.8 Methodology for household food waste calculations for product groups



Source: ICF

1.5 Food product profiles for EU food waste

Food waste profiles that focused on food product categories were compiled using the methodologies described in Section 1.4. The outputs covered all 196 cells of the Table A1.2 matrix of Member States and food waste sectors, with the exception of food service sector (for which a single profile was generated for the EU-28 as a whole).

The results are presented in a series of charts that cover:

- Variation in profiles across the EU-28 Member States
- Avoidable food waste
- With or without date marks(for retail and food service profiles)

1.5.1 Food processing/ manufacture

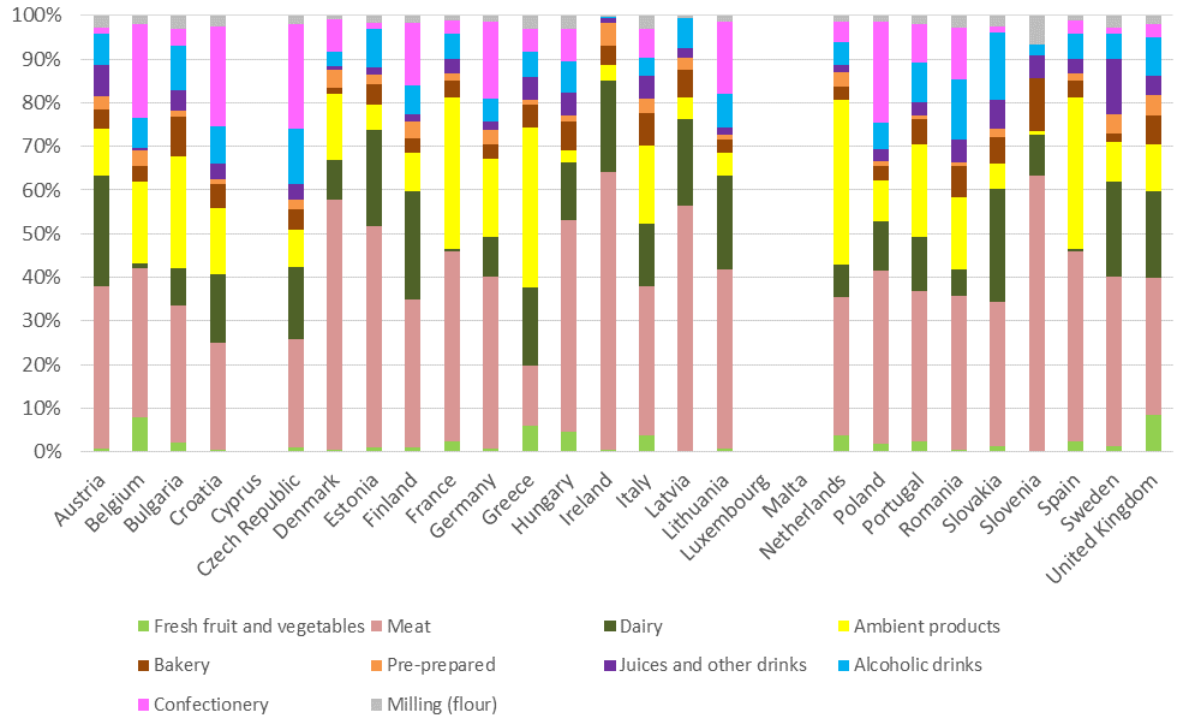
The MS profiles in Figure A1.9 reflect variation in food and drink production across EU and are for all food waste, including inedible materials not intended for human consumption.

As the underlying data reflects the UK resource efficiency of production processes and their wastage rates, they do not take account of variation in technologies, innovations in the use of surpluses or alternative markets to avoid materials becoming waste.

Figure A1.10 indicates the avoidable/ unavoidable split of food waste within each manufacturing sub-sector. The WRAP 2016 study estimated the proportion of food waste that might be regarded as 'avoidable'. This was not a full economic appraisal of waste prevention potential, but relied on expert judgement, site visits and the use of Whole Supply Chain Resource Efficiency Reviews carried out by WRAP between 2008 and 2016 (WRAP Whole Chain Resource Efficiency Projects (WRAP, 2015a). The majority of the unavoidable fraction will be inedible materials rejected from production processes. Some of the edible fraction is classed as 'unavoidable' (e.g. non-recoverable material in site washing and cleaning residues). It may not be commercially viable to recover, given current costs and technologies. Figure A1.11 shows the MS profiles for avoidable food waste.

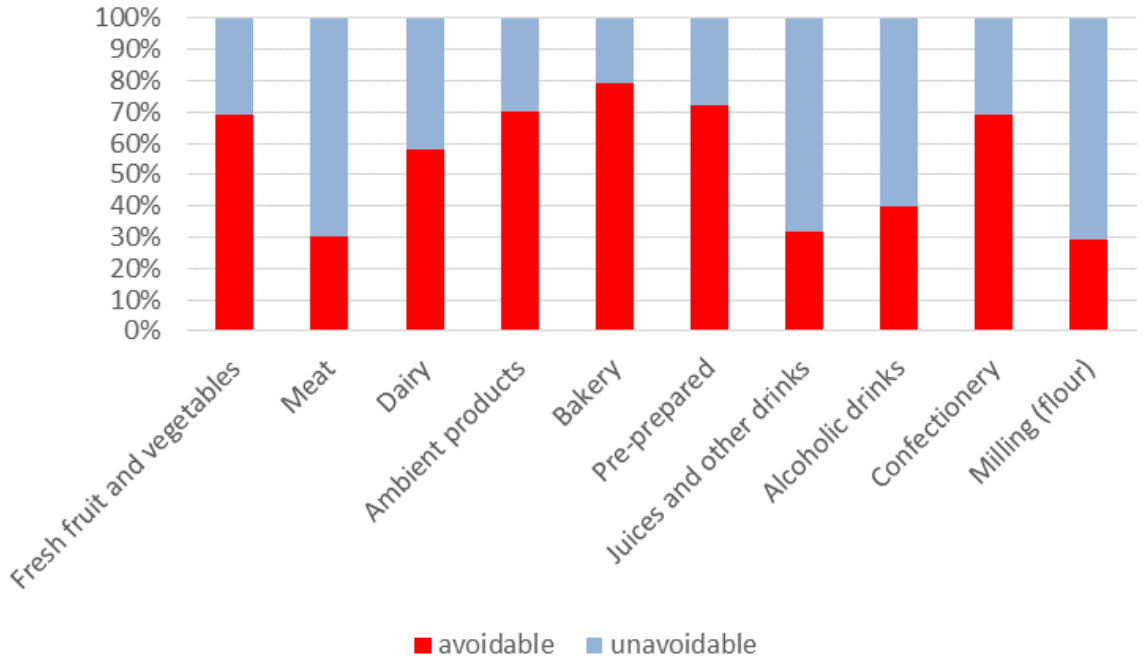
The food manufacturing sectors that account for the highest proportion of overall avoidable food waste are ambient products (30%), meat/ poultry/ fish processing (23%) and confectionery/ sugar processing (13%). See Figure A1.12.

Figure A1.9 Food processing/ manufacture: variation in proportion of total food waste contributed by different production sub-sectors by MS



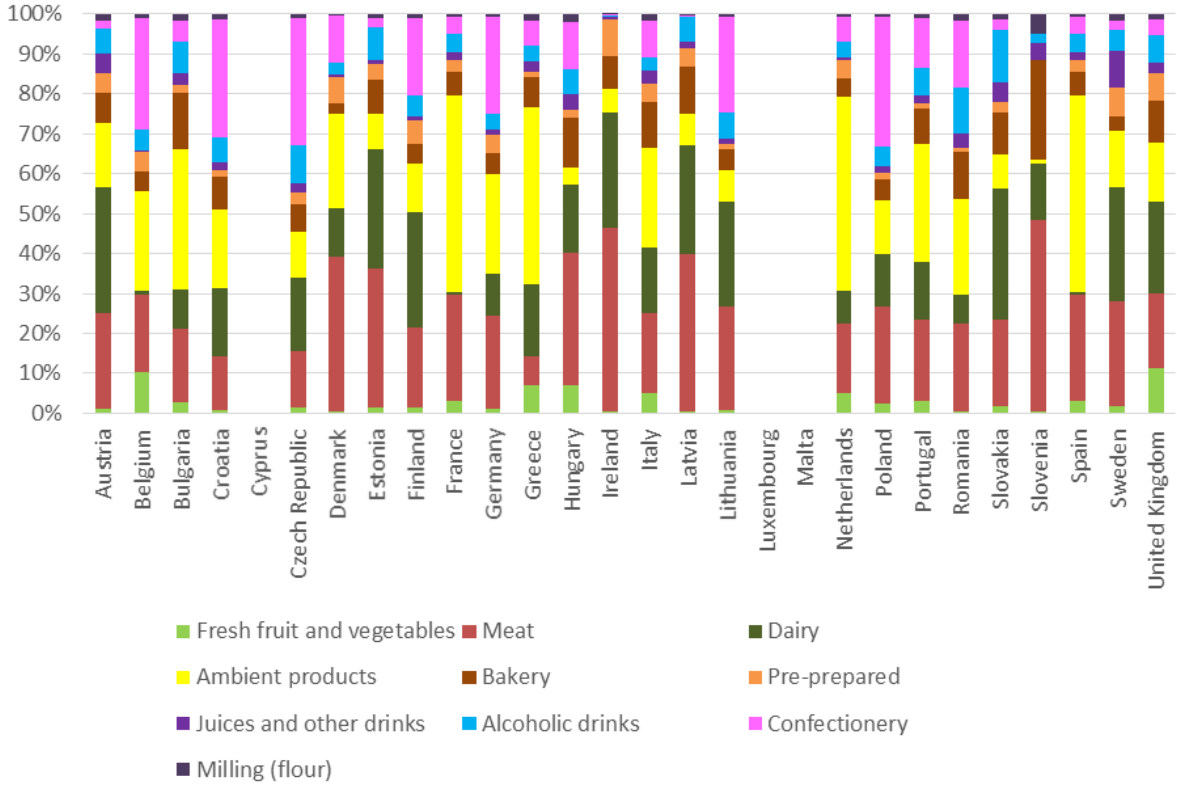
Source: ICF, based on 2016 data from PRODCOM and WRAP (2016)

Figure A1.10 Food processing/ manufacture: avoidable versus unavoidable food waste by industry sub-sector



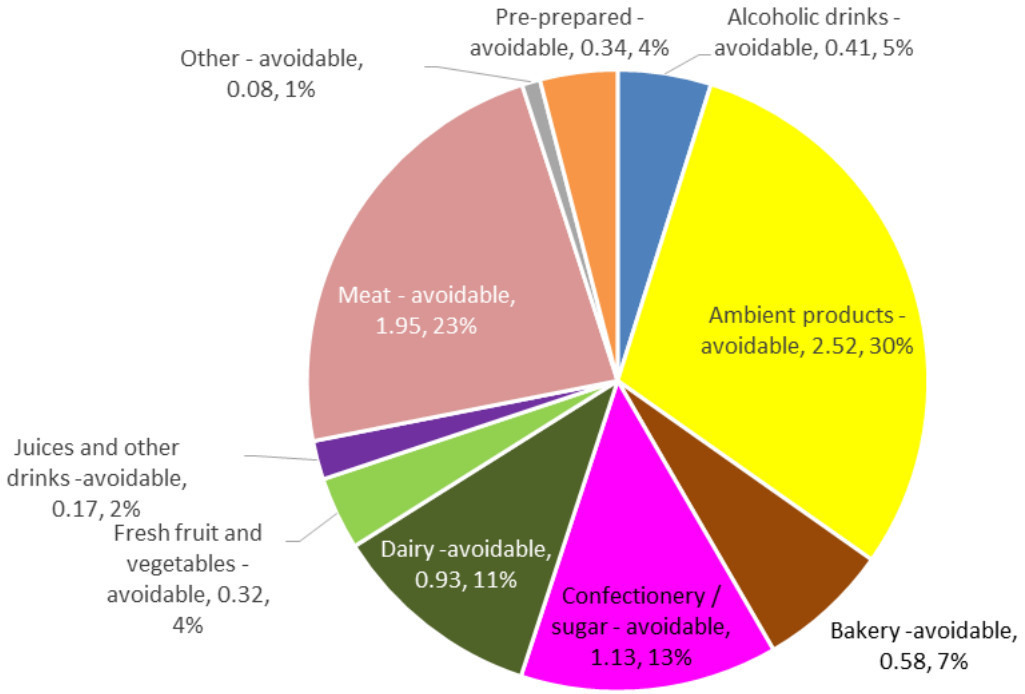
Source: ICF, based on 2016 data from PRODCOM and WRAP (2016)

Figure A1.11 Food processing/ manufacture: variation in proportion of avoidable food waste contributed by production sub-sectors by MS



Source: ICF, based on 2012 data from PRODCOM and WRAP (2016)

Figure A1.12 Food processing/ manufacture waste by food category (Mt/year)



Source: ICF, based on 2012 data from PRODCOM and WRAP (2016)

1.5.2 Retail food waste

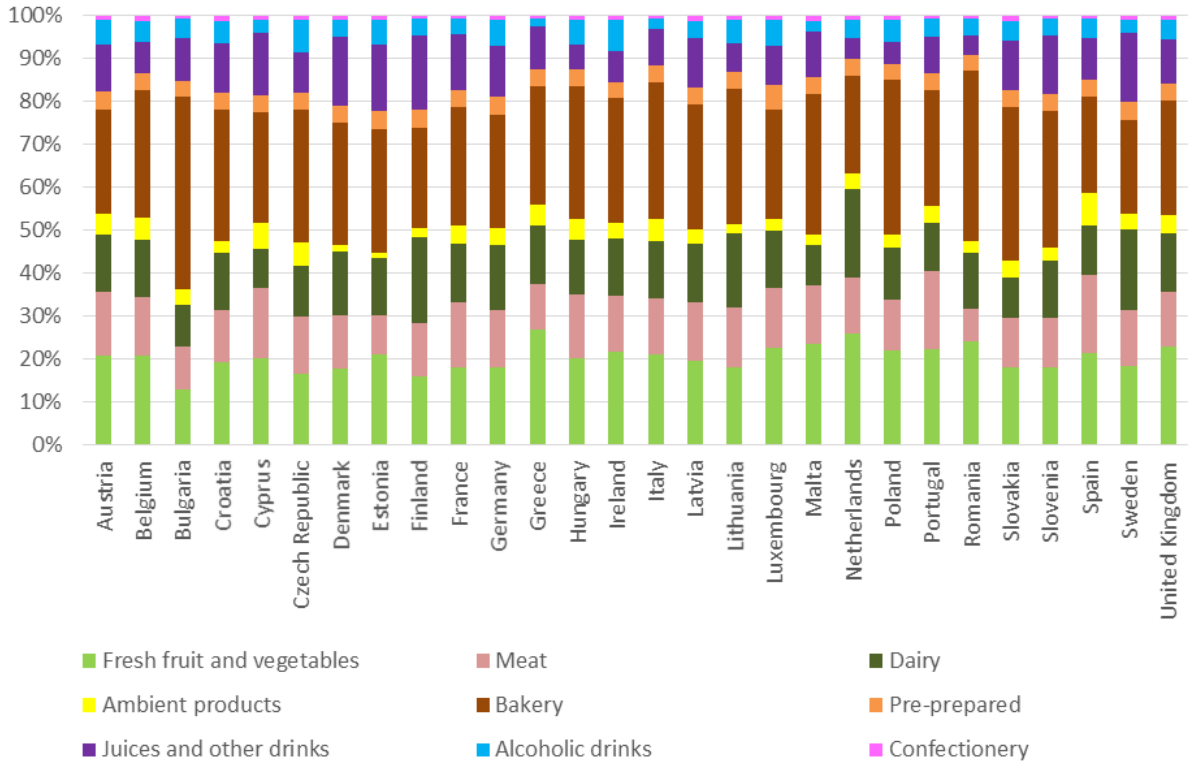
As all retail products are intended for sale, and retailers sell whole items rather than just the 'edible fraction' of the food on display, the analysis has categorised all retail food waste as potentially avoidable.

Bakery products account for the highest proportion of retail food waste. Differences in bread product and purchasing patterns across Europe are likely to produce wider variations than the MS profiles in Figure A1.13 have been able to capture. As the profile is influenced by UK retailing of bakery products, the proportion is likely to be higher in countries that do not consume packaged loaves and buy fresh bakery products for same day consumption. However, in-store bakery is a major contributor to the UK profile, a trend away from standard sliced loaves that has occurred over a number of years.

Fresh produce contributes the second highest proportion to retail grocery food waste. More detailed analysis presented in Section 1.4.2 shows that product damage accounts for 60% of the loss (through handling and quality issues). About 40% is product unsold due to date expiry.

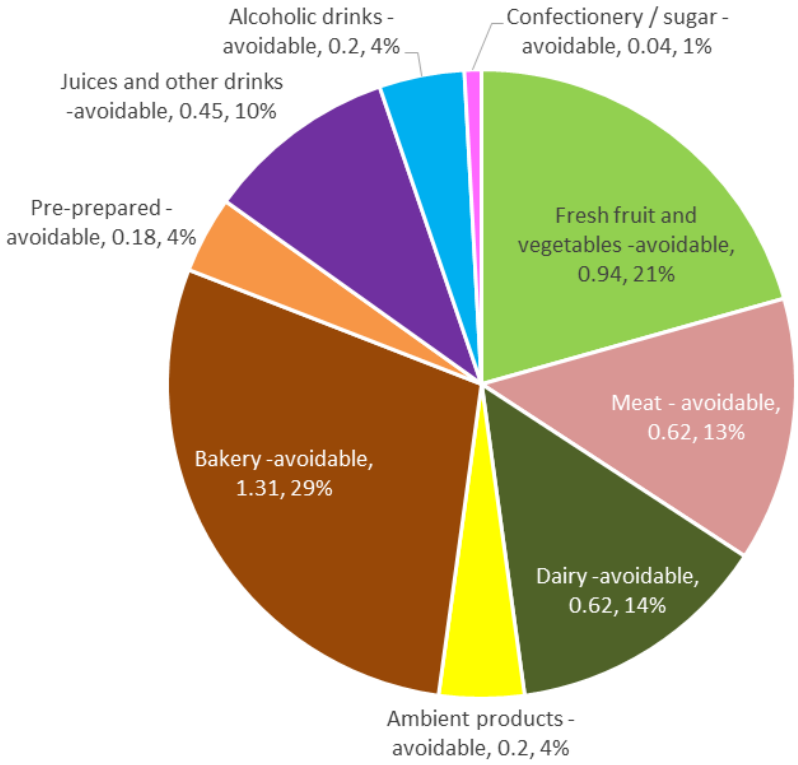
Dairy and meat product categories each contributed a similar proportion of waste, with quality and damage reasons accounting for the higher share of wastage than date expiry. (See Figure A1.14.)

Figure A1.13 Retail food waste by food category, profile by MS



Source: ICF, based on FAO (2011c) and WRAP (2016a)

Figure A1.14 Retail food waste by food category (Mt)



Source: ICF, based on European Commission (FP7), Coordination and Support Action (2016b), FAO (2011) and WRAP (2016a)

Analysis of product wasted with or without date labels

Using the more detailed product and packaging data available for the retail sector, it has been possible to look at food waste by reference to whether or not the unsold item was packaged (and so carried a date label). Table A1.9 provides an EU-level summary derived from the FUSIONS retail total. The split between 'date mark or not' is taken from WRAP 2016a data relating to current UK retailer policies. (The easiest removal of date marks would be in relation to un-cut/ non-pre-prepared fresh fruit and vegetables, where for many products "best before" dates are discretionary but commonly applied.) It is likely that retailers procuring fresh produce from local suppliers in many parts of Europe are more likely to use wooden trays to supply loose produce direct to store. Consequently, application of date marks will be at a much reduced level (e.g. restricted to out of season produce procured from further afield).

As commented earlier, the variation in food culture associated with bakery products (bread, morning goods, cakes) across Europe is not reflected in the date labelled bakery waste estimates in Table A1.9.

Table A1.9 Retail analysis of food waste by whether or not unsold product has date label (in Mt/year)

Product	Total	Date mark	No date mark
Fresh fruit and vegetables	0.94	0.91	**0.03
Meat	0.62	0.39	0.22
Dairy	0.62	0.62	0.00
Ambient products	0.20	0.20	0.00
Bakery	1.31	0.32	0.99
Pre-prepared	0.18	0.18	0.00
Juices and other drinks	0.45	0.45	0.00
Alcoholic drinks	0.20	0.20	0.00
Confectionery	0.04	0.04	0.00
Total	**4.56**	**3.32**	**1.24**

***Likely to be higher as fruit/ vegetables are sold loose in retail with more local supply chains across Europe*

Source: ICF, based on European Commission (FP7), Coordination and Support Action (2016b) and WRAP (2016a)

There are three main categories of food product that are not date labelled:

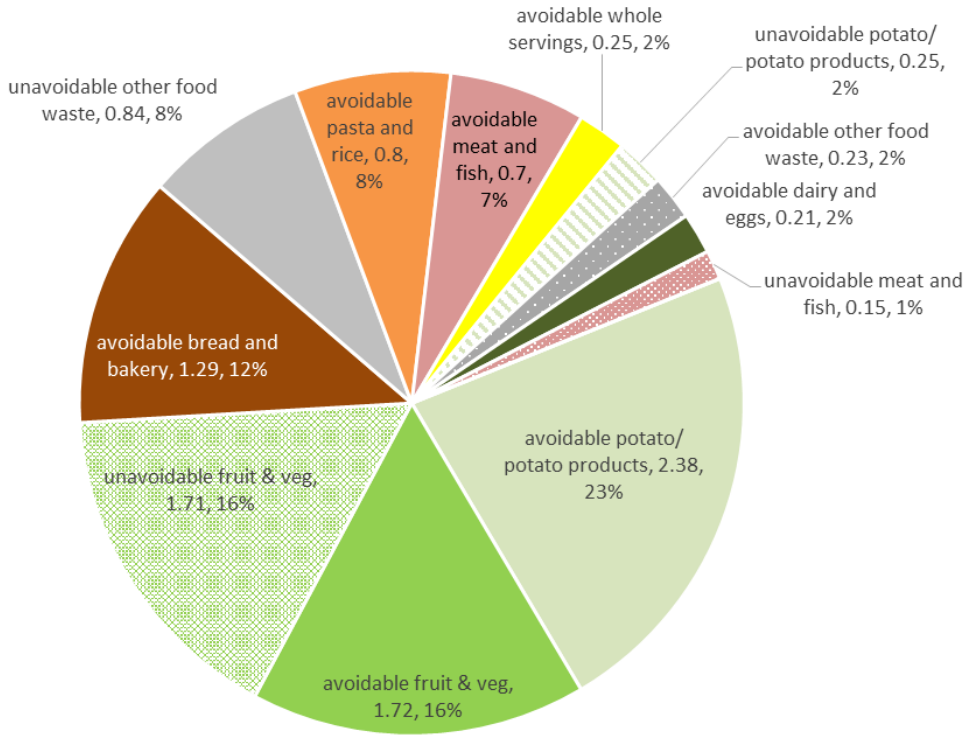
- Loose fruit and vegetables (but the overall allocation of packaged to loose reflects UK supermarkets)
- Fresh meat/fish, sold at counter/ delicatessen
- Fresh bakery & morning goods / in-store/ delivered fresh to store

1.5.3 Food service food waste

The EU profile for food waste composition for the food service sector is shown in Figure A1.15. The split of avoidable and unavoidable fractions is indicated for each of the main product categories. This profile is greatly influenced by the extent to which food service outlets cook from scratch or use pre-prepared ingredients or meals. Traditional 'cook to order' restaurants generally generate significantly more food preparation waste and the unavoidable food waste fraction is therefore a higher proportion of total food waste. The overall profile reflects the split of UK food service provision.

The three categories of avoidable food waste account for 50% of total food waste: potato and potato products (23%), fresh fruit and vegetables (16%) and bakery products (12%). Higher value food categories that contribute to avoidable waste (meat /fish /poultry and dairy products) account for less than 10% of total food waste.

Figure A1.15 EU Food service waste profile for EU 28 by avoidability (Mt / year)



Source: ICF

Table A1.10 Food service food waste estimated for EU28, with and without date labels (in Mt/year)

Product	Total	Date label	No date label
Potatoes, pasta, rice	3.4	2.7	0.8
Fruit & vegetables	3.4	0.6	2.8
Bread and bakery	1.3	0.9	0.4
Meat and fish	0.9	0.2	0.6
Dairy and eggs	0.2	0.2	0
Other	1.3	1.3	0
Total	**10.5**	**5.9**	**4.6**

Source: ICF, based on WRAP (2013f)

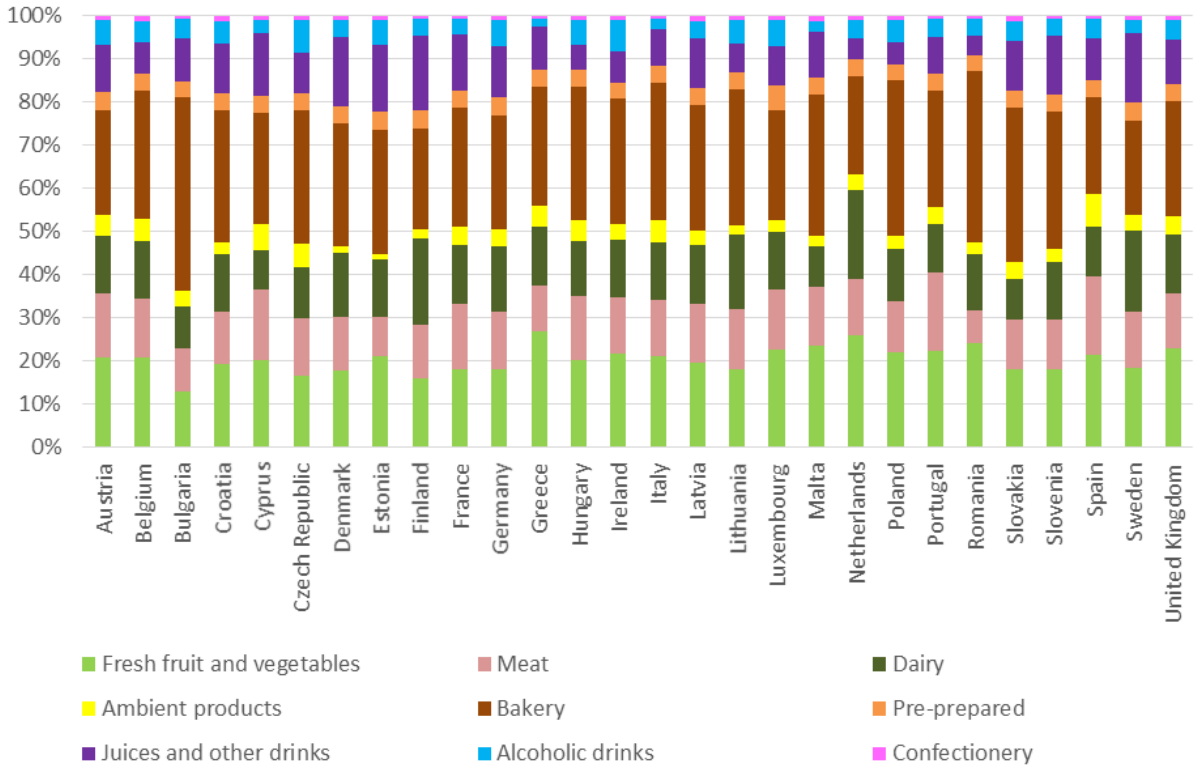
Table A1.10 indicates the extent to which food products are date labelled in the food service sector, based on an assessment carried out for WRAP 2013 of the extent to which food is procured from specialist wholesale markets or from delivered wholesale service providers. Certain foods are more likely to be procured frozen or packaged (examples are potato, pasta and rice products). The food procurement routes used by the food service sector are also a function of the type of food service outlets. 'High dining' and independent restaurants more likely to procure from local markets and specialist suppliers. No datasets were identified for EU 28 that examined variation in this aspect of food service. It is likely to be an important influence on both the extent to which procured products are packaged and for the use of date marks.

1.5.4 Household food waste

Figure A1.16 shows variation in household food waste by product category linked to FAO food balance sheet data. The data show particular variation in the proportion of total food waste within bakery, fresh fruit and vegetables and soft drink categories. These differences should be viewed with caution as the derivation of the food waste profiles requires more primary research into variation in the proportion of grocery purchases consumed across Member States. For instance, the proportion of meat waste appears higher in Portugal and Spain as a reflection of a higher proportion of meat purchased. However, meat might be consumed more efficiently than the wastage factors that were derived from the primary research conducted in the UK.

It is not possible to provide a split of household food waste in relation to the nature of any date coding associated with discarded products. This is due to the fact that most packaged food products are separated from their packaging at or before the point of discard (during product use, or for the purposes of recycling) and compositional analysis is usually carried out on waste as it set out for collection.

Figure A1.16 Household food waste by food category, profile by MS

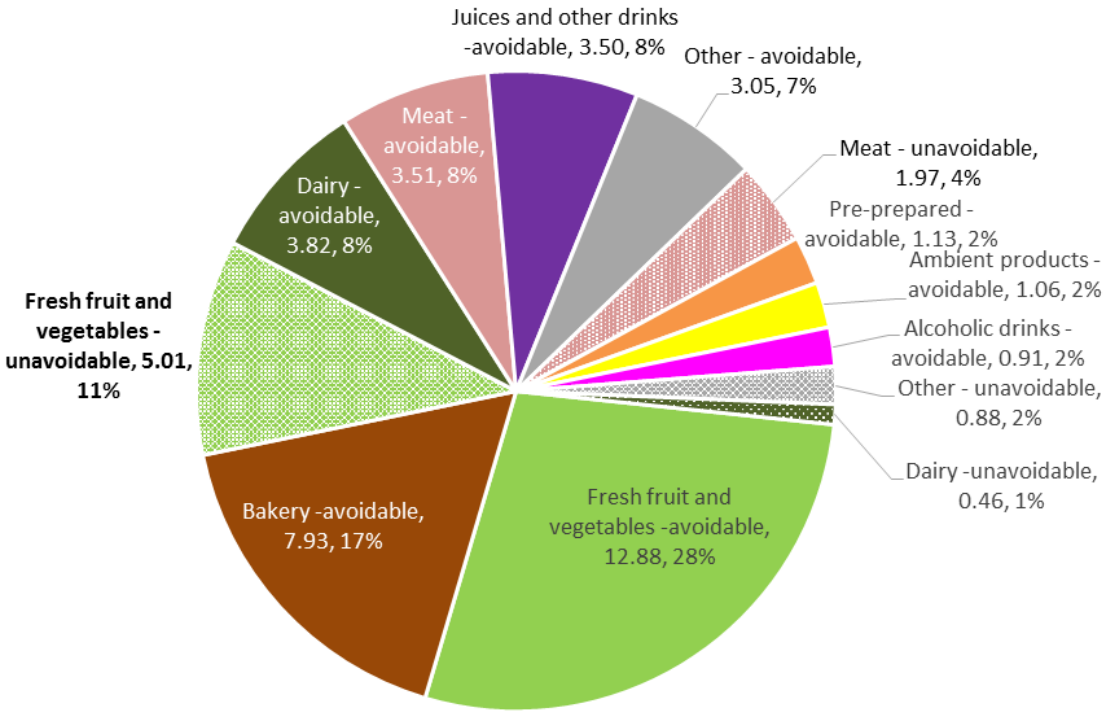


Source: ICF, based on FAO (2011c)

The overall profile of household food waste, split by avoidability, is presented in Figure A1.17. Fresh fruit and vegetables (including potatoes) and bakery products account for the largest proportion (28% and 17% respectively). Avoidable food waste associated with dairy, meat and soft drinks each account for a further 8% of total food waste.

In comparison to the proportion of unavoidable food waste within the food service profile (29% of total food waste), the overall proportion of unavoidable food waste is only 18%.

Figure A1.17 Total EU household food waste (million tonnes) by food type and avoidability (Mt / year)



Source: ICF

Table A1.11 Hotspot analysis of product life extension opportunities by product category

Product category	Sub-category	[A] Total life (Days)*		[B} Available life (on-shelf) in days		[C] Available life/total life (%)	[D] Open life range (Days)	[E] Use of display until or no dates	[F] Use of use by and best before codes	[G] Limiting factor and buffer (Days)	[H] Potential to extend total life (Ease-impact)	[I] MLOR Range (%)	[J]Impact of date expired losses on on-shelf availability (%)	[K}Potential sales uplift (%)
		Mean	Range	Mean	Range									
Bread	Medium sliced white	6.8	6 to 10	2.9	6.8	43	N/A	Yes	No	N/A	N/A	N/A	0.1	0.04 to 0.05
	In store bakery	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Quality (0)	High -Low	N/A	1.3	0.44 to 0.63
Potatoes	Labelled 'white potatoes' or potatoes	10	6 to 12	4.3	10	43	N/A	Yes	No	Quality (0)	Med - High	45 to 80	0.4	0.13 to 0.18
Yoghurt	Strawberry	20	15 to 30	13.7	20	69	N/A	No	Yes	N/A	N/A	N/A	0.6	0.20 to 0.29
Juice	Orange juice with bits	45	12 to 80	35.7	45	79	2 to 5	Yes	Yes	Quality (up to 7)	Med-Med	50 to 93	0	0.01 to 0.02
Milk	Standard semi-skimmed	13	11 to 13	7.9	10.5	61	3	Yes	No	Quality (2 to 3)	Low-Low	58 to 91	0	0.01 to 0.02
Salad	Bagged labelled 'iceberg;'	8.3	7 to 10	3.5	8.3	42	1	Yes	No	Quality (2)	Low-Low	43 to 100	0.8	0.26 to 0.38
Sliced ham	Labelled 'ham' or 'cooked ham'	20	16 to 30	12.2	20	61	2 to 3	Yes	No	Safety (up to 5)	High-High	17 to 78	0.4	0.13 to 0.19
Ready meals	(Beef) Lasagne	25.3	12 to 30	7.6	25.3	30	N/A	Yes	No	Safety (0)	Low-Med	N/A	0.1	0.03 to 0.05
Chicken breasts	Whole skinless breast fillets	10	8 to 10	4.7	10	47	0 to 2	Yes	No	Safety (1)	Low-Low	44 to 82	0.3	0.12 to 0.17
Prepared food	Chicken Kiev	9.5	8 to 10	4.1	9.5	43	0 to 1	Yes	No	N/A	Low-Med	N/A	0.4	0.14 to 0.20
Prepared food	Margherita pizza (or cheese & tomato)	10.5	8 to 15	4.5	10.5	43	N/A	Yes	No	Quality (1)	Low-Med	N/A	0.9	0.31 to 0.44
Apples	Pre-packed	N/A	9 to 15	N/A	N/A	N/A	N/A	N/A	N/A	Quality	Med-High	50 to 89	0.3	0.11 to 0.15

Product category	Sub-category	[A] Total life (Days)*		[B} Available life (on-shelf) in days		[C] Available life/total life (%)	[D] Open life range (Days)	[E] Use of display until or no dates	[F] Use of use by and best before codes	[G] Limiting factor and buffer (Days)	[H] Potential to extend total life (Ease-impact)	[I] MLOR Range (%)	[J]Impact of date expired losses on on-shelf availability (%)	[K}Potential sales uplift (%)
		Mean	Range	Mean	Range									
	Granny Smiths									(0)				
Mince	Beef	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Safety (2)	Med-High	N/A	N/A	N/A

**A small number of products in the samples, particularly for juice and a smaller number for other products, such as lasagne, are longer life products and this explains some of the larger ranges in 'product life'*

Column [A] Total Life is the length of time a product may be stored without becoming unsuitable for consumption, with regards to food safety and/or quality; it is not the same as the 'maximum' life, which is the technical maximum product life that could be set without compromising food safety

Column [B] Available life is the period of time remaining on a product at a given stage in the supply chain

Column [C] The available life remaining as a proportion of the total life

Column [D] Open life the period of time that may be stated on a product which stipulates the period in which the product should be consumed once opened , e.g. 'once opened consume within x days'

Column [E] Display until or no date applied to product

Column [F] Highlights where "use by" and "best before" dates may be found on products within sub-category

Column [G] Limiting factor defines the main issue that is linked to food date expiry, with the buffer (safety margin) indicating the time period between the 'maximum' life and expiry of avalable life.

Column [H] An indication of the potential that exists to extend total life [A] in terms of ease and likely impact

Column [I] Minimum life on receipt is a key performance measure used by retailers to ensure the amount of available life [B] remaining on a product when delivered to retail depot is sufficient for retail and consumer stages

Column [J] On-shelf availability, the availability of a product "on the shelf" for the conumser purchase, is a key metric for retailers

Column [K] The potential increase in sales if the impact on date expired losses [J] could be reduced in full

Source: ICF, based on WRAP (2013)

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Annex 3 Market research methodology

The main purpose of the market research was to identify differences and similarities in date marking practices for products that look, from a consumer perspective, quite similar. Other relevant information such as the length of shelf-life available for consumers at time of purchase (i.e., at time of survey), and whether foods with shorter shelf-life were made available at discount, was also documented.

The research was conducted using a 'mystery shopping' format in which pre-specified products were purchased from a target list of stores in eight Member States: Germany (DE), Greece (EL), Hungary (HU), the Netherlands (NL), Poland (PL), Slovakia (SK), Spain (ES) and Sweden (SE).

Section 3.1 describes the target product types.

Section 3.2 sets out the methodology for fieldwork.

3.1 Food product types for mystery shopping

The food product types and the factors leading to their selection are set out in Section 3.1 below.

Table A3.1 Food product types to be included in the mystery shopping

Food product category and % waste‡	Food product types for mystery shopping‡	Rationale for inclusion in the fieldwork: detail around date mark and sensitivity to date mark issue at consumer stage and on-pack advice :open life, storage / home freezing
Fresh fruit/ vegetables (33%)	Pre-prepared fruit/ vegetables[5]	This food product category contributes the highest proportion of avoidable food waste for food service, retail and household food waste across EU-28. For 'non pre-prepared' fruit/ vegetables there is no legal requirement to use date marks and where date labels are applied is noted that consumers are less responsive to date marks on these products in making decisions on whether or not to discard as food waste. Throughout much of EU-28 fresh produce is sold loose and without date marks. Pre-prepared fruit/ vegetables that have been chopped/grated are labelled with "use by" dates. Fruit/ vegetables that have been pre-prepared in another way, such as simply being washed (e.g. washed carrots), may have "best before" dates. There is also variation in storage advice for fresh produce.
Bakery (21%)	Sliced bread	This produce category is the second highest contributor to avoidable food waste across food service, retail and household sectors. Bakery products in general bear a risk of high food waste due to their limited shelf life which may increase wastage rates if demand predictions are wrong. Packaged bakery products, such as sliced bread, may have either 'display until' or 'best before'

[5] Pre-prepared fresh produce are products that are sold for ready use, without the need for the consumer to carry out chopping, slicing or other preparation work.

Food product category and % waste‡	Food product types for mystery shopping‡	Rationale for inclusion in the fieldwork: detail around date mark and sensitivity to date mark issue at consumer stage and on-pack advice :open life, storage / home freezing
		dates and may also include advice for home freezing and 'do not refrigerate' advice. Packaged bakery products will therefore be included in the fieldwork to explore variations in the use of date marks, home freezing and storage advice and the high volume in relation to total EU-28 avoidable food waste. The packaged bakery product chosen is sliced bread as that is likely to be widely available.
Meat, fish, poultry (10%)	Chilled fish Sliced ham	Consumers have a high sensitivity to date labels on fresh meat, fish and poultry products which may lead to higher wastage rates, hence their inclusion in the field study. Chilled fish and sliced ham are high value products where different practices are apparent in the setting of shelf life and types of date mark applied.
Dairy (including milk, cheese and eggs) (10%)	Fresh milk Yoghurts Hard cheese	Consumers are more attentive to date marks in relation to certain dairy products. Discard decisions may rely more on 'date' than visual cues, particularly in relation to yoghurts; however, different types of date mark are applied, adding to confusion. There is also a possible variance in freezing and storage advice for milk and unnecessarily short dates applied to certain yoghurt products. These aspects and the confusion with the use of date marks for these products have led to them being included in the fieldwork.
Soft drinks/ Juices (8%)	Fresh juice (chilled)	Fruit juice/ chilled fresh product may use a variety of different date marks with varying lengths of product shelf life and may give open life advice. Consumer research shows sensitivity to date mark in consumer decision to dispose of unconsumed product. Fresh juice has therefore been included in the fieldwork.
Pre-prepared meals (chilled) (4%)	Pre-prepared chilled pasta	These often have 'use by' dates. Additionally, variations in home freezing advice in relation to date of purchase may be an issue with certain pre-prepared meals such as chilled pasta, hence their inclusion in the fieldwork.
Ambient product (4%)	Tomato ketchup	The length of shelf-life may vary significantly for the same or similar products and also in relation to the open life and storage instructions that appear on the label. Variation in storage advice e.g. 'once opened keep refrigerated'.

Source: ICF

‡Food waste means "avoidable proportion of total food waste in EU-28 retail, food service and household sectors".

Detailed product specifications for each of the 10 product types are set out in Table 8 of Section 3.2.1 of the main report.

3.2 Field work methodology

3.2.1 Objectives

The main objective was to maximise the diversity of date marking and other information on food labels. To achieve this, it was necessary to maximise the diversity of items purchased within the 10 defined product types.

To maximise the diversity of items purchased, care was taken to prioritise larger retailer organisations ("retailers") and larger store formats and to visit one store of each selected retailer only once. Store formats are defined below in Section 3.2.2.

Retailers were selected on the basis that selecting them would:

- increase the likelihood of fieldworkers obtaining the target food products (or suitable substitutes) at store visits;
- enable the widest possible selection of products to be obtained at each retail store visit; and
- account for different shopper demographics and retailer market positioning

3.2.2 Store formats

As no formal definition of store format was found in the literature, store formats were defined as follows:

- **Hypermarkets:** Hypermarkets are large retail spaces which combine a supermarket and a department store under one roof. Of the four store formats, they sell the widest range of merchandise, extending beyond groceries and general household items to include, for example, clothes, medicines, and audio-visual equipment. They are also the largest, averaging 16,000 square metres in size.
- **Supermarkets:** Supermarkets are grocery stores offering a wide variety of food products, including perishable items such as meat, produce and dairy, along with a limited range of non-food household items (e.g. cleaning supplies, paper products, and health/beauty care products). Retail sales area ranges from 1,800 to 6,000 square metres.
- **Convenience stores**: Typically, convenience stores are limited to high-convenience items and food basics that people commonly use and need quickly, such as toilet paper, soft drinks, and microwavable and prepared foods. The average convenience store is 450 square metres in size.
- **Discounter:** A discounter is a grocery shop or organization which specializes in selling grocery items very cheaply. Discounters usually sell a more limited range of products than conventional supermarkets and tend to stock retailers' own-brand products rather than branded products. Typically, the discounters account for between 20-30% of market share across the eight Member States.
- **Dark stores and cash and carry**: Dark stores are large warehouses that supply online grocery sales. Cash and carry stores are also warehouses but generally supply customers from the food service and catering sector.

The fieldwork sampled from hypermarkets, supermarkets, and discounters. Convenience stores were excluded because of the limited nature and smaller stock of the range of products that they sell. Dark stores were excluded because they are not visited by consumers. Cash and carry stores were excluded because they sell mostly to customers from the food service and catering sector rather than to consumers.

3.2.2 Development of sampling strategy

The most recently available data on grocery retailers in the eight selected Member States are presented in Table A3.2[6]. These data were used to develop quotas for store visits by Member State that:

- balanced discounters and conventional stores;
- took account of overall market shares; and, where possible,
- included a mix of endemic and multinational retailers.

Table A3.3 presents the resulting long list of retailers.

3.2.3 Store identification

Fieldworkers were recruited from ICF's network in major cities of the eight Member States. For each of the retailers in the long list, they identified stores in their cities, specifically: Hamburg (DE), Athens (EL), Budapest (HU), Amersfoort near Amsterdam (NL), Warsaw (PL), Bratislava (SK), Barcelona (ES), and Gothenburg (SE). The study team then used Google Maps and/or the retail chain's website to check the suitability of that store (i.e., to see that it was larger than a convenience store).

Once eight suitable conventional retail stores and four suitable discounters had been confirmed for each Member State, fieldwork began. Supplementary store visits were undertaken in two additional cities of Germany (Munich, Rottenburg), Poland (Krakow, Raciborz) and Spain (Madrid, Cordoba). These supplementary store visits were used in part to explore capture additional retailers, and in part to explore the issue of whether date labels on products sold at different stores of the same retailer vary across the regions of the larger Member States. This issue was also explored in Sweden where, due to difficulty in reaching a total of 12 chains, an ica maxi hypermarket and a Lidl discounter were visited in Umeå as well as Gothenburg.

Table A3.4 identifies the chains visited by each mystery shopper, and Table A3.5 identifies the region in which each store visit was undertaken for each of the eight Member States.

[6] These data relate to market share or ranking within the market if market share data are not available; and number of outlets by store format, where this information could be obtained. These data are not available from a single consistent data source for the EU-28, nor are the data complete. In addition, the data do not extend to the grocery sector operating outside of supermarket channels: through small independent stores, through roadside trailers and stalls, or through street markets.

Table A3.2 Main grocery retailers pre-selected for retail market survey by store format, market share or rank, and number of stores

Member State	Predominant store formats											
	Hypermarket			Supermarket			Convenience			Discounter		
	Name of retailer	Share/ Rank	No. stores	Name of retailer	Share/ Rank	No. stores	Name of retailer	Share/ Rank	No. stores	Name of retailer	Share/ Rank	No. stores
Germany	Kaufland	17%	3,400	Edeka	23%	7,700				Aldi	15%	4,189
				Rewe	14%	1,800				Lidl	7%	600
										Penny (Rewe)		2,200
										Netto (Edeka)		4,400
Greece				Carrefour Marinopoulos	2nd	330	Carrefour Express	1st	333	Lidl	5th	220
				Alfa-Beta Vassilopoulos	3rd	286				Sklaventsis	7th	107
				Masoutis	4th	200						
				Veropoulos	6th	329						
Hungary	Tesco	1st	112	Coop	2nd	364				Real	5th	600
	SPAR	4th	32	CBA	3rd	150				Penny (Rewe)		200
	Auchan		19	SPAR	4th	350				Lidl		164
				Tesco		50				Aldi		100
Nether-lands				Albert Hein	35%	950				Lidl	9%	400
				Jumbo/C1000	17%	600				Aldi	7%	400
				Plus	6%							

Member State	Predominant store formats											
	Hypermarket			Supermarket			Convenience			Discounter		
	Name of retailer	Share/ Rank	No. stores	Name of retailer	Share/ Rank	No. stores	Name of retailer	Share/ Rank	No. stores	Name of retailer	Share/ Rank	No. stores
Poland	Carrefour	3rd		CBA (Nasz Sklep)		3,000				Biedronka (Jeronimo Martins Polska)	1st	3,000
	Tesco	4th								Lidl	2nd	525
	Auchan	5th	50							Netto		350
	Kaufland	6th	168									
Slovakia	Kaufland	10%	46	Tesco	17%	150	COOP Jednota Potraviny	10%		Lidl	14%	130
	Tesco			COOP Jednota Supermarket	17%							
				Kaufland	10%							
				Bila	7%							
				Temo	4%							
Spain	El Corte Inglès	14%		Mercadona	22.5%	1,600	OpenCor			Grupo Dia	8.1%	4,800
	Carrefour	8,5%	170	Grupo Auchan	3.6%					Lidl	4.3%	532
	Grupo Eroski	5.8%	75	Grupo Eroski City		219				Aldi		250
	HiperCor			SuperCor								

Member State	Predominant store formats											
	Hypermarket			Supermarket			Convenience			Discounter		
	Name of retailer	Share/ Rank	No. stores	Name of retailer	Share/ Rank	No. stores	Name of retailer	Share/ Rank	No. stores	Name of retailer	Share/ Rank	No. stores
Sweden	ICA MAXI Stormarknad		80	ICA Supermarket	2nd	430	ICA Nara	1st	678	Netto	3rd	350
	Coop Forum		39				ICA Kvantum	6th	124	Lidl	4th	150
										Willy's	5th	140

Sources: Euromonitor 2015, Kantar World Panel, 2017, Planet Retail 2014, USDA, 2015

Table A3.3 Allocation of retail visits to MS by store format and by named retailer

Country	**Super/hypermarkets** (8 visits per MS)		**Discounters** (4 visits per MS)	
	Name	Visits	Name	Visits
Germany	EDEKA	1	Aldi	1
	REWE	1	Lidl	1
	Others	6	Penny Markt	1
			Netto	1
Greece	Sklaventis	1	Lidl	1
	Alfa-Beta Vassilopoulos	1	Economy supermarket	1
	My Market	1	Others	2
	Others	5		
Hungary	Tesco	1	Aldi	1
	Coop	1	Lidl	1
	CBA	1	Penny (Rewe)	1
	Others	5	Others	1
Nether-lands	Albert Heijn	1	Lidl	1
	Jumbo/C1000	1	Aldi	1
	Others	6	Others	2
Poland	Carrefour	1	Biedronka (JMP)	1
	Tesco	1	Netto	1
	Delikatesy Centrum	1	Others	2
	Others	5		
Slovakia	Tesco	1	Lidl	1
	COOP Jednota	1	Others	3
	Kaufland	1		
	Others	5		
Spain	Mercadona	1	Grupo Dia	1
	Hiper/SuoerCor	1	Lidl	1
	Carrefour	1	Aldi	1
	Others	5	Others	1
Sweden	ICA MAXI Stormarknad/ ICA Supermarket	1	Netto	1
	Coop Forum	1	Lidl	1
	Others	6	Willy's	1
			Others	1
Total Visits	**Super/ hypermarkets**	**64**	**Discounters**	**32**

Source: ICF

Table A3.4 Chains visited by mystery shoppers

MS	Supermarkets and hypermarkets			Discounters		
	Name	Coverage	Visits	Name	Coverage	Visits
DE	EDEKA	National	3	Aldi (Nord)	Regional	1
	HIT	National	1	Aldi (Süd)	Regional	1
	Kaufland	National	1	Lidl	National	1
	Markant	National	1	Penny Markt	National	2
	REAL	National	1	Netto	National	1
	REWE	National	1	Norma	National	1
	Sky	Regional	1			
	Tengelmann	Regional	1			
	V-Markt	Regional	1			
EL	Alfa-Beta Vassilopoulos	National	1	Bazaar Discount Market	National	1
	Galaxias	National	1	Economy supermarket	Regional	1
	Kritikos	Regional	1	Lidl	National	1
	Market In	Regional	1			
	My Market	National	1			
	OK Market	Regional	1			
	Promitheutiki	Regional	1			
	Sklaventis	National	1			
	Thanopoulos	Regional	1			
HU	Auchan	Regional	1	Aldi	National	1
	CBA	National	1	CBA Cent	National	1
	Coop	National	1	Lidl		1
	G'Roby	Regional	1	Penny		1
	Interspar	National	1			
	Prima	National	1			
	Reál	National	1			
	Tesco	Regional	1			
NL	Albert Heijn	National	1	Aldi		1
	Coop	National	1	Boni		1
	Dekamarkt	National	1	Dirk		1
	Emte	National	1	Lidl		1
	Hoogvliet	National	1			
	Jumbo/C1000	National	1			
	Plus	National	1			
	Spar	National	1			

MS	Supermarkets and hypermarkets			Discounters		
	Name	**Coverage**	**Visits**	**Name**	**Coverage**	**Visits**
PL	Aldik	Regional	1	Aldi		1
	Carrefour	National	1	Biedronka (JMP)	National	1
	Delikatesy Centrum	National	1	Lidl	National	2
	E Leclerc	National	1	Netto	Regional	1
	Intermarche	Regional	1			
	Kaufland	National	1			
	Lewiatan	National	1			
	Lidl	National	1			
	Piotr i Pawel	National	1			
	Tesco	National	1			
	Top Market	Regional	1			
SK	Billa	National	1	CBA Diskont	Regional	1
	Carrefour	Regional	1	Lidl	National	1
	CBA Potraviny	Regional	1			
	Cent CBA	Regional	1			
	COOP Jednota	National	1			
	Kaufland	National	1			
	Moj Obchod	National	1			
	Moja Samoška	Regional	1			
	Terno	Regional	1			
	Tesco	National	1			
ES	Ahorra Mas	Regional	1	Aldi	National	1
	Alcampo	National	1	Dia	National	1
	Bon Preu	Regional	1	Lidl	National	2
	Carrefour	National	2	Piedra		1
	Condis	Regional	1			
	Coviran	National	1			
	Deza	Regional	1			
	Hiper/SuoerCor	National	1			
	Mercadona	National	1			
SE	City Gross	Regional	1	Lidl	National	2
	Coop Forum	National	1	Netto	Regional	1
	Handlarn	National	1	Willy's Hema	National	1
	Hemköp	Regional	1			
	Ica maxi	National	2			
	Matöppet	Regional	1			
	Tempo	National	1			
	Total visits to Supermarkets and Hypermarkets		**75**	**Total visits to Discounters**		**34**

Source: ICF

Table A3.5 List of stores visited by mystery shoppers in each Member State

MS / Store visit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Germany (DE)	Edeka (supermarket)	REWE (supermarket)	Kaufland (hypermarket)	Lidl (discounter)	Markant (supermarket)	Real (supermarket)	Penny (discounter)	Aldi Nord (discounter)	Netto (discounter)	Sky (supermarket)	Aldi Süd (discounter)	Edeka (supermarket)	V Markt (hypermarket)	HIT (supermarket)	Penny (discounter)	Tengelmann (supermarket)	Edeka (supermarket)	Norma (discounter)
Greece (EL)	AB Vasilopoulos (supermarket)	Sklavenitis (hypermarket)	My Market (supermarket)	Lidl (discounter)	Economy (discounter)	Market In (supermarket)	Promitheutiki (supermarket)	Galaxias (supermarket)	Bazaar Discount (discounter)	Kritikos (supermarket)	Thanopoulos (hypermarket)	OK market (supermarket)						
Hungary (HU)	Coop (supermarket)	Lidl (discounter)	Real (supermarket)	Prima (supermarket)	CBA (supermarket)	Tesco (hypermarket)	Auchan (hypermarket)	G'Roby (supermarket)	Interspar (hypermarket)	Penny (discounter)	Aldi (discounter)	CBA cent (discounter)						
Netherlands (NL)	Albert Heijn (supermarket)	Jumbo (supermarket)	Aldi (discounter)	Lidl (discounter)	Boni (supermarket)	Dirk (hypermarket)	Coop (supermarket)	Plus (supermarket)	Dekamarkt (discounter)	Emte (supermarket)	Hoogvliet (supermarket)	Spar (supermarket)						
Poland (PL)	E Leclerc (hypermarket)	Carrefour (hypermarket)	Biedronka (discounter)	Piotr I Pawel (supermarket)	Delikatesy Centrum (supermarket)	Top Market (supermarket)	Netto (discounter)	Aldi (discounter)	Aldik (supermarket)	Lidl (discounter)	Lewiatan (supermarket)	Tesco (supermarket)	Intermarche (supermarket)	Kaufland (hypermarket)	Auchan (hypermarket)			
Slovakia (SK)	COOP Jedotna (supermarket)	Kaufland (hypermarket)	Billa (supermarket)	Tesco (hypermarket)	Terno (supermarket)	Mojobchod (supermarket)	MojaSamoška (supermarket)	Carrefour (hypermarket)	Lidl (discounter)	CBA (supermarket)	Cent CBA (supermarket)	CBA Diskont (discounter)						
Spain (ES)	Mercadona (supermarket)	Bon preu (supermarket)	Dia (discounter)	Hipercor (hypermarket)	Aldi (discounter)	Carrefour (hypermarket)	Condis (supermarket)	Lidl (discounter)	Alcampo (hypermarket)	Carrefour Market (Supermarket)	AhorraMas (discounter)	Lidl (discounter)	Deza (hypermarket)	Piedra (discounter)	Coviran (supermarket)			
Sweden (SE)	ica maxi (hypermarket)	Lidl (discounter)	Hemkop (supermarket)	COOP Forum (hypermarket)	Willys Hemma (discounter)	Netto (discounter)	Handlarn (supermarket)	Matoppet (supermarket)	Tempo (supermarket)	City Gross (supermarket)	ica maxi (hypermarket)	Lidl (discounter)						

MS / Store visit			
Germany (DE)	North Germany	Southeast Germany	Southwest Germany
Poland (PL)	Central-East Poland	Southern Poland	Southwest Poland
Spain (ES)	Northeast Spain	Central Spain	Southern Spain
Sweden (SE)	Southern Sweden	Northern Sweden	

Source: ICF

3.2.4 Data gathering

Without bringing attention to themselves, and in accordance with the detailed product specifications, fieldworkers purchased single items of each brand found during a store visit. After each store visit, the fieldworkers recorded, via an online questionnaire, the following contextual data for the store from observations taken:

- name of the fieldworker and unique identification reference for the store;
- date and time of shopping trip;
- store name and location;
- store format, whether supermarket/hypermarket or discounter;
- replenishment of stock activity during store visit (i.e. staff replenishing dairy product areas during store visit, stocking levels of fresh produce very low at time of store visit);
- how busy the store is and the retail staff were (i.e. long queue at checkouts and store very busy);
- any promotions in store relating to the list of target products; and
- any additional comments on the site visit to note not covered by the above.

The fieldworkers also recorded the following information for each product:

- product and whether it was a preferred or substitute product;
- justification of any product substitutions;
- size;
- packaging format;
- location of date labels on packaging and where shown in relation to date mark wording;
- date(s) shown on the product label;
- exact wording used to describe date mark(s) – e.g. best before/ use by/ display until (in corresponding language of the Member State);
- open life instructions s– e.g. once opened use within x days and keep refrigerated;
- on-pack storage advice, for example:
  - storage advice on purchasing – e.g. store in a cool dry place;
  - Storage advice once opened – e.g. once opened, please keep refrigerated;
  - freezing advice – e.g. suitable for home freezing, freeze on day of purchase, freeze before use by date, not suitable for home freezing;
  - logos – e.g. a snowflake to signify suitable for freezing, a fridge or breadbin to indicate recommended storage location;
  - recommendations to increase product life/ maintain quality/ freshness;
- any discount labels applied to food products and proximity to date mark;
- method of processing – e.g. pasteurisation;
- packaging details/ technique – e.g. vacuum packed, packaging gases, protective atmosphere;
- details of legibility of information; and

- cultural or country specific notes.

Table A3.6 (overleaf) sets out a fictional example of data gathered during a store visit.

3.2.4 Photographic records

Fieldworkers compiled a systematic photographic record of the products purchased on the day of each store visit. This included photographs of the:

- front of pack;
- date label information, including any supplementary advice as listed above;
- ingredients list; and
- barcode.

In the case of food products that had both food contact packaging and outer packaging (such as cardboard sleeves), the photographs covered both packaging elements. For example, in the case of a yoghurt multipack that had an outer cardboard sleeve, a photograph was taken of the sleeve and any information on it, and another photograph was taken of the area underneath the cardboard sleeve and any information featured there. The photos included any date marks appearing on the products as well as other relevant open-life instructions and on-pack storage advice, such as home freezing advice, "once opened, eat within x day" and home storage instructions. A unique reference number was created for each store visit such that the data and photographs recorded could be linked to that store visit. Fieldworkers uploaded the images to a secure shared online workspace.

3.2.5 Quality assurance checks

The study team reviewed each fieldworker's data entries and corresponding photographs and then gave feedback on any errors to that fieldworker. This feedback resulted in correction of errors in data recording or in amendment to products purchased in subsequent store visits.

Table A3.6 Data fields filled out for a hypothetical example of a target product

MYSTERY SHOPPING GUIDE	Name of fieldworker		Unique store ID reference	
Retail store data				
Date	Time	Store name	Store format	Store location	Was replenishment of stock occurring during the visit?	Level of business during visit	Promotions in store relating to the list of target products
13/05/17	*20:00*	*Tesco*	*Hypermarket*	*Hungary*	*Yes*	5: very busy	*Promotion covering bakery items*
General observations from the store visit:					*Very busy, no parking available*		

Food product information					
Product (note if a substitute product); and Brand	Justification for substitute product	Size	Packaging format/ details	Date shown on Date Mark	Location of the Date Mark
Chilled Orange juice; SIO	*Not applicable*	*1 litre*	*Plastic bottle with plastic cap*	*20/05/17*	*Date is on the cap*

Wording to qualify the Date Mark (e.g., Best Before/ Use By/ Display Until in relevant languages)	Where is the Wording in relation to the Date Mark?	Has a Price Discount Label been applied to the package?	Where is the Price Discount Label in relation to the Date Mark?
Use By	*Wording is on front panel/ label, but Date is on the cap.*	*Yes*	*Discount label is on front panel, but Date is on the cap*

Open life instructions (e.g. "*After opening, refrigerate, eat within 8 weeks*")	Other on-pack storage advice	Legibility of information	Cultural or country-specific notes	Is the Product subject of a promotional offer?	Food processing technology details (e.g. pasteurised)	Packaging technology details (e.g. vacuum packed)
"Once opened, consume within 5 days"	*"Keep refrigerated"*	*Information was/ was not clearly displayed*	*Chilled orange juice is seen as a luxury item in Hungary*	*Yes: 'buy one get one free'*	*None*	*None*
Picture files for this product (names and description)	*HU_Tesco_130517_Orange juice 1 (front of pack) ; HU_Tesco_130517_Orange juice 2 (date label)HU_Tesco_130517_Orange juice 3 (storage advice)*					

Source: ICF

Annex 4 Market research data gathered

4.1 Products sampled by Member State

Table A4.1 Numbers and proportions of target (strawberry 4-pack) and substitute yoghurts purchased, by Member State

Target product and substitutes	**DE**	**EL**	**HU**	**NL**	**PL**	**SK**	**ES**	**SE**	**Total**
Strawberry yoghurt 4 pack (number and %)	**16**	**0**	**1**	**4**	**4**	**1**	**22**	**9**	**57**
	36%	**0%**	**3%**	**36%**	**9%**	**3%**	**96%**	**50%**	**25%**
Forest berries yoghurt in single pot (number, %)	0	0	1	0	0	1	0	0	2
	0%	0%	3%	0%	0%	3%	0%	0%	1%
Mixed flavours yoghurt 4 pack (number and %)	3	0	0	7	1	0	0	6	17
	7%	0%	0%	64%	2%	0%	0%	33%	7%
Mixed flavours yoghurt 6 pack (number and %)	0	0	0	0	0	0	0	2	2
	0%	0%	0%	0%	0%	0%	0%	11%	1%
Plain yoghurt single pot (number and %)	0	0	0	0	0	2	0	0	2
	0%	0%	0%	0%	0%	5%	0%	0%	1%
Raspberry yoghurt 6 pack (number and %)	1	0	0	0	0	0	0	0	1
	2%	0%	0%	0%	0%	0%	0%	0%	0%
Strawberry yoghurt 2 pack (number and %)	1	3	0	0	2	0	0	0	6
	2%	18%	0%	0%	5%	0%	0%	0%	3%
Strawberry yoghurt 3 pack (number and %)	0	14	0	0	0	0	0	0	14
	0%	82%	0%	0%	0%	0%	0%	0%	6%
Strawberry yoghurt 6 pack (number and %)	0	0	0	0	0	0	1	0	1
	0%	0%	0%	0%	0%	0%	4%	0%	0%
Strawberry yoghurt single pot (number, %)	24	0	31	0	37	34	0	1	127
	53%	0%	94%	0%	84%	89%	0%	6%	55%
Total	**45**	**17**	**33**	**11**	**44**	**38**	**23**	**18**	**229**

Source: ICF

Table A4.2 Numbers and proportions of target (fresh semi-skimmed cows' milk) and substitute milk, by Member State

Target product and substitutes	**DE**	**EL**	**HU**	**NL**	**PL**	**SK**	**ES**	**SE**	**Total**
Fresh semi-skimmed cows' milk (number and %)	**3**	**24**	**48**	**25**	**47**	**20**	**17**	**22**	**206**
	10%	**44%**	**98%**	**96%**	**84%**	**95%**	**100%**	**100%**	**75%**
Fresh full fat cow's milk (number, %)	11	30	1	1	1	1	0	0	45
	35%	56%	2%	4%	2%	5%	0%	0%	16%
Fresh low fat cow's milk (number, %)	17	0	0	0	8	0	0	0	25
	55%	0%	0%	0%	14%	0%	0%	0%	9%
Total	**31**	**54**	**49**	**26**	**56**	**21**	**17**	**22**	**276**

Source: ICF

Table A4.3 Numbers and proportions of target (pre-packed, white, medium sliced) and substitute bread, by Member State

Target product and substitutes	**DE**	**EL**	**HU**	**NL**	**PL**	**SK**	**ES**	**SE**	**Total**
Pre-packed, white, medium sliced bread (number, %)	**26**	**0**	**3**	**9**	**11**	**15**	**26**	**14**	**104**
	74%	**0%**	**14%**	**82%**	**19%**	**75%**	**96%**	**58%**	**42%**
Pre-packed sliced toast bread (number and %)	9	53	18	2	43	1	0	8	134
	26%	100%	86%	18%	75%	5%	0%	33%	54%
Pre-packed, durum wheat sliced bread (number and %)	0	0	0	0	0	1	0	0	1
	0%	0%	0%	0%	0%	5%	0%	0%	0%
Pre-packed, wheat-rye, sliced bread (number and %)	0	0	0	0	2	3	0	0	5
	0%	0%	0%	0%	4%	15%	0%	0%	2%
Pre-packed, white, sourdough bread (number and %)	0	0	0	0	1	0	0	1	2
	0%	0%	0%	0%	2%	0%	0%	4%	1%
Pre-packed, white, thick sliced bread (number and %)	0	0	0	0	0	0	1	1	2
	0%	0%	0%	0%	0%	0%	4%	4%	1%
Total	**35**	**53**	**21**	**11**	**57**	**20**	**27**	**24**	**248**

Source: ICF

Annex 5 Examples of wording on products purchased

Table A5.1 Date wording on products purchased versus standard wording for "best before", "use by", and other date types

MS	Date wording in English (BB/UB/ Other)	Date wording specified by FIC regulation in MS language	Examples of wording on products purchased [with translation by mystery shopper] *Examples where wording deviates from standard wording are shown in italics*
DE	"Best before" or "Best before end..."	"mindestens haltbar bis ..." "mindestens haltbar bis Ende ..."	Ungeöffnet mindestens haltbar bis: siehe Clip oder Etikett [(Unopened, best before: see clip or label] mindestens haltbar bis: siehe Giebel [Best before: see top] Im Kuhlschrank bis max +7C mindestens haltbar bis: sehe datum auf Packungruckseite [When stored in a refrigerator at +7C maximum, best before: see back of pack] Bei ungeöffneter Packung mindestens haltbar bis: Siehe Aufdruck Clip [If unopened, best before: See stamp on tie] Bei +4C bis +8C mindestens haltbar bis: [When stored between +4C +8C, best before:]
DE	Use by	"zu verbrauchen bis"	zu verbrauchen bis: [Date] bei Lagerung unter +7C [Store below +7C and use by [Date]] Ungeöffnet bei unter +7C zu verbrauchen bis: [Unopened, stored below +7C, use by:] Lagerung +2 ºC bis +7 ºC Ungeöffnet zu verbrauchen bis: [Store between +2 ºC and +7 ºC Unopened use by:] [On front of pack:] Verbrauchsdatum: siehe Rückseite [Use-by date: see rear] [On rear of pack:] Zu verbrauchen bis: siehe Aufdruck/Zusatzetikett [Use by: see datestamp]

MS	Date wording in English (BB/UB/ Other)	Date wording specified by FIC regulation in MS language	Examples of wording on products purchased [with translation by mystery shopper] *Examples where wording deviates from standard wording are shown in italics*
EL	"Best before" or "Best before end..."	"Ανάλωση κατά προτίμηση πριν από ...", "Ανάλωση κατά προτίμηση πριν το τέλος…"	ανάλωση κατά προτίμηση πριν το τέλος:βλέπε συσκευασία…….. [best before: see on the package] Ανάλωση κατα προτίμηση πριν απο το τέλος [Best before end of] 1) *Ανάλωση έως [use by]* 2) ανάλωση κατά προτίμηση βλέπε συσκευασία [best before see on pack] *ημερομηνία παραγωγής και ανάλωση κατα προτίμηση βλέπε πάνω μέρος συσκευασίας* [production date and the expiration date see on package] 1)ανάλωση κατα προτίμηση πριν απο βλεπε συσκευασία [best before see package] 2)*ημερομηνια λήξης/ [expiration date]* ανάλωση κατα προτίμηση πριν απο βλεπε συσκευασία…….. [best before see package]……*ημερομηνια λήξης…... / [expiration date]* ανάλωση κατά προτίμηση πριν απο βλέπε κλείσιμο και συσκευασία [best before see closing ring and on pack]
EL	Use by	"ανάλωση έως"	Ανάλωση μέχρι / [Use by] ανάλωση έως δείτε την συσκευασία / [use by see on pack] ανάλωση πριν απο / [Use by] Ανάλωση βλ. στην συσκευασία…….. / [Use by see reverse] *ημερομηνία λήξης / [expiration date]* 1)Ανάλωση έως / [use by] 2)Ανάλωση έως την ημερομηνία που αναγράφεται στο πάνω μέρος της συσκευασίας [use by see printed on the top] 1)*ημερομηνία ανάλωσης / [consume date]* 2)ανάλωση μεχρι βλεπε συσκευασια [use by see on pack] 1)*λήξη / [expired]* 2)ανάλωση μέχρι βλέπε συσκευασία / [Use By see on packaging]

MS	Date wording in English (BB/UB/ Other)	Date wording specified by FIC regulation in MS language	Examples of wording on products purchased [with translation by mystery shopper] *Examples where wording deviates from standard wording are shown in italics*
HU	"Best before" or "Best before end..."	"Minőségét megőrzi: …" "Minőségét megőrzi … végéig"	Bontatlan csomagolásban tárolva minőségét megőrzi (nap, hónap, év) [Storing in unopened package, best before (day, month, year)] Minőségét megőrzi (nap, hónap, év) a flakon hátoldalán jelzett időpontig [Best before (day, month, year) the date marked on the back of the bottle] Felbontás nélkül minőségét megőrzi (nap, hónap, év) a záróelemen jelzett időpontig [Unopened, best before (day, month, year) marked on the closure] Bontatlan csomagolásban tárolva minőségét megőrzi (nap, hónap, év) [Best before with storing in unopened package (day, month, year)] Minőségét megőrzi (lásd csomagolás) [Best before (see packaging)] Minőségét megőrzi 2 és 6 fok között tárolva (nap/hónap/év): lásd a kupakon [Best before by storing at 2 and 6 degree until (day /month /year) see: on cap] 1) Minőségét megőrzi (nap, hónap, év) [Best before (day, month, year)] 2) Minőségét megőrzi (nap, hónap, év) a csomagoláson jelzett időpontig [Best before (day, month, year) on the top of the package:]
HU	Use by	"fogyasztható: "	Fogyasztható (nap, hónap, év) : bontatlan csomagolásban tárolva a csomagolás hátulján jelzett időpontig [Use by (day, month, year): store in unopened package until the date displayed] Fogyasztható hűtve, 0-8 fok közötti hőmérsékleten tárolva (nap, hónap, év) a fedőfólián jelzett időpontig [Use by (day, month, year): store refrigerated between 0-8 degree until the date displayed]

MS	Date wording in English (BB/UB/ Other)	Date wording specified by FIC regulation in MS language	Examples of wording on products purchased [with translation by mystery shopper] *Examples where wording deviates from standard wording are shown in italics*
			Fogyasztható (nap, hónap, év) a fólia hátoldalán jelzett időpontig [Use by the date (day, month, year) marked on the back of the foil]
			Fogyasztható: lásd a csomagoláson [Use by: see on package]
NL	"Best before" or "Best before end..."	"Ten minste houdbaar tot ..." "Ten minste houdbaar tot einde ..."	Ten minste houdbaar tot / [Best before]
			ten minste houdbaar tot einde: zie hals van fles / [Best before: see neck of bottle]
			Mits gekoeld bewaard ten minste houdbaar tot: / [If stored refrigerated, best before:]
			Gekoeld bewaren (max 7 graden). Ongeopend ten minste houdbaar tot: zie datum bovenzijde. [Store refrigerated (max 7 degrees). Unopened, best before: see date upside]
			Ongeopend, ten minste houdbaar tot [Unopened, best before]
			Ten minste houdbaar tot, mits gekoeld bewaard (7): zie voorzijde verpakking [Best before, if stored refrigerated (7): see front of pack]
NL	Use by	"te gebruiken tot"	Te gebruiken tot en met (date) mits gekoeld bewaard (max 7 degrees C) [Use by (date) if kept chilled (max 7 degrees C)]
			Bij max 7 te gebruiken tot en met / [If stored at max 7 (degrees) use by]
			Te gebruiken tot / [Use by]
NL	*Other: Sell by dates for bread*	*[No wording is specified in the FIC regulation for this date type]*	*Dagvers gebakken, verkoopdatum / [baked daily, date of sale]*
			Uiterste verkoopdatum / [final date of sale]

MS	Date wording in English (BB/UB/ Other)	Date wording specified by FIC regulation in MS language	Examples of wording on products purchased [with translation by mystery shopper] *Examples where wording deviates from standard wording are shown in italics*
PL	"Best before" or "Best before end..."	"Najlepiej spożyć przed …" "Najlepiej spożyć przed końcem …"	Najlepiej spożyć przed: data, kod produkcji na zakretce / [Best before: date, production code on the cap] Najlepiej spożyć przed: data umieszczona na zamknięciu opakowania / [Best before: date placed on the closing of the package] Najlepiej spożyć przed / [Best before]
PL	Use by	"należy spożyć do"	Należy spożyć do: patrz wieczko / [Use By: see the lid] Należy spożyć do: data i nr partii na wieczku / [Use By: date and batch number on lid] *(NB this is a contradiction with original English wording alongside, which says Best Before)* Należy spożyć do: termin przydatnosci do spozycia, ktory rowniez jest numerem partii produkcyjnej, na gorze opakowania / [Use by: validity date, which is also the number of production batch, on top]
SK	"Best before" or "Best before end..."	"Minimálna trvanlivosť do …" "Minimálna trvanlivosť do konca …"	Minimálna trvanlivost do / [Best before] minimálna trvanlivosť do dátumu uvedeného v hornej časti obalu / [Best before the date indicated at the top of the packaging) *Dátum minimálnej trvanlivosti [Date of best before]*
SK	Use by	"spotrebujte do"	*Datum balenia: 11.06.2017 [Date of Packaging: 11.06.2017]* Spotrebujte do: 16.06.2017 [Use by: 16.06.2017] Spotrebujte do [Use by] spotrebujte do dátumu vyznačenom na tégliku [use by the date marked on the cup]

MS	Date wording in English (BB/UB/ Other)	Date wording specified by FIC regulation in MS language	Examples of wording on products purchased [with translation by mystery shopper] *Examples where wording deviates from standard wording are shown in italics*
SK	*Other: an "Enjoy by date"*	*[No wording is specified in the FIC regulation for this date type]*	*vychutnávajte si ma do [enjoy me in]*
ES	"Best before" or "Best before end..."	"consumir preferentemente antes del ..." "consumir preferentemente"	Consumir preferentemente antes del /Lote :ver parte frontal de la bolsa [Best before /Batch :see the front of the bag] Consumir preferentemente / [best before] Lot/consumir preferentemente abans del:vegeu indicacio a la parte frontal de l'envas / [Batch/best before :see front of the packet] Consumiu-lo preferentement abans del /numero de lot: vegeu l'envas: / [Best before the batch number :see packet] Consumiu-lo preferentement abans de la fi : vegeu el tap / [Best before end : look on the cap] Consumir preferentemente antes del /lote / [best before /batch] Consumir preferentemente antes del :/Lote :ver parte frontal de la bosa / [Best before : Batch -see front of the packet] *Data de consum : Numero de lot /* consumiu-los preferentement abans de vegeu l'envas / *[Expiry date : Batch number* -Best before see packet*]* Consumiu-lo preferentement abans del /numero de lot: vegeu l'envas: / [Best before the batch number :see packet]
ES	Use by	"fecha de caducidad"	Fecha de caducidad/lote *Consumir antes /Lote* [Expiry date /batch *Best before /batch*] *1) (on the side) Data de caducitat :[Date of expiry]* 2) (on the label) -Data caducitat : Veure impres a la bolsa /.[Expiry date :Look at the stamp on the bag] *CADUCIDAD / [expiration]*

MS	Date wording in English (BB/UB/ Other)	Date wording specified by FIC regulation in MS language	Examples of wording on products purchased [with translation by mystery shopper] *Examples where wording deviates from standard wording are shown in italics*
ES	*Other: date of catch for fish*	*[No wording is specified in the FIC regulation for this date type]*	*Fecha de captura:ver impresion en la parte delantera /* *[Date of catch :see the print on the front]*
SE	"Best before" or "Best before end..."	"Bäst före..." "Bäst före utgången av..."	bäst före bäst före i obruten förpackning: se datumstämpel [best before] [best before in unopened packing: see date mark] bäst-före bäst-före-datum gäller endast obruten förpackning / [best before] [best before date only applies to unopened packet] bäst före datumstämplen gäller oöppnad förpackning / [best before] [date mark applies to unopened packing] Bäst före *Förp dag* / [Best before*] [Packing day]* bäst före *förp dag* / [best before] *[packing day]* bäst före *förp* dag bäst före (BF): se toppen / [best before] *[packing day]* [best before (BF): see top] bäst före *förp dag* bäst före: se förpackningens topp / [best before] *[packing day]* [best before: see top of packing] Bäst före *Förp. dag* / [Best before] *[Packing day]*
SE	Use by	"sista förbrukningsdag"	Sista förbrukningsdag som anges på förpackningen gäller endast obruten förpackning vid förvaring under +3 grader c [Use by date on the package is only valid for unopened packing stored below +3 degrees] sista förebrukningsdag [Use by date] oöppnad vara sista förbrukningsdag: [unopened, use by [date is]:]

Source: ICF

Annex 6 Images of date marks & wording for all product types

Figure A6.1 Chilled fish: date mark and wording together on label on reverse of pack

Wording: "bei max, +7°C zu verbrauchen bis"; *Transl.: [store] at max. 7°C [&] use by*

Source: ICF

Figure A6.2 Fresh juice: date mark and wording together on side of carton

Source: ICF

Figure A6.3 Fresh juice: date mark at top of carton

Source: ICF

Figure A6.4 Fresh juice: date wording on side of carton

Wording: "Consumir preferentemente antes del (día, mes y año) y lote: ver solapa superior"

Translation: Best before (day, month, year) and batch: see upper flap

Source: ICF

Figure A6.5 Fresh juice: date mark on neck of plastic bottle

Source: ICF

Figure A6.6 Fresh juice: date wording on side of plastic bottle

Wording: "Najlepiej spożyć przed – patrz na szyjce butelki lub na etykiecie"

Translation: Best before – see the bottle neck or label

Source: ICF

Figure A6.7 Fresh milk: date mark on neck of plastic bottle

Source: ICF

Figure A6.8 Fresh milk: date wording on side of plastic bottles

Wording: "Ungeöffnet bei +8°C mindestens haltbar bis: siehe oben"

Translation: Unopened and stored at +8°C, best before: see top

Source: ICF

Figure A6.9 Fresh milk: date mark at top of carton

Source: ICF

Figure A6.10 Fresh milk: date wording on side of carton

Wording: "Ongeopend ten minste houdbaar tot: zie datum bovenzijde";

Translation: Unopened, best before: see date above

Source: ICF

Figure A6.11 Fresh milk: date mark and wording together at top of carton

Wording: "BÄST FÖRE [27 Jun]"; translation "Best before [27 Jun]"

(The other date [18 Jun] is a packing date.)

Source: ICF

Figure A6.12 Hard cheese: date mark and wording together on label on front of pack

Wording: "Fogyasztható +2°C és +7 között tárolva (nap/hónap/év)"

Translation: "Store between +2°C and +7°C and use by (day/month/year)"

Source: ICF

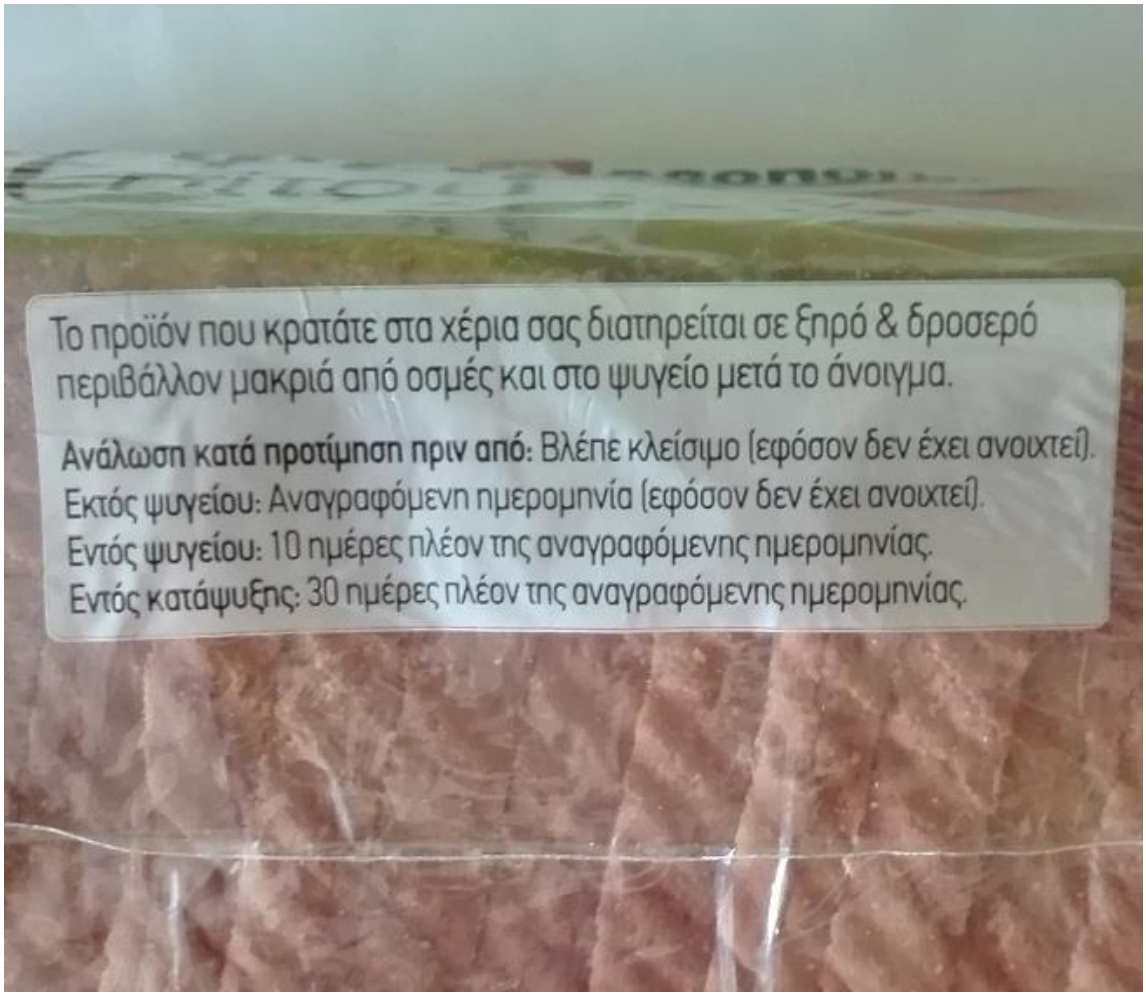
Figure A6.13 Pre-packaged sliced bread: date mark on fastening clip

Source: ICF

Figure A6.14 Pre-packaged sliced bread: date wording on side of bag

Wording: "Ανάλωση κατά προτίμηση πριν από: Βλέπε κλείσιμο (εφόσον δεν έχει ανοιχτεί)

Translation: "Best before: see fastening (if unopened)" "



Source: ICF

Figure A6.15 Pre-prepared chilled pasta: date mark on film lid

Source: ICF

Figure A6.16 Pre-prepared chilled pasta: date wording on label on reverse of pack

Wording: "Fecha de caducidad/ Lote: ver frontal"

Translation: "Use by/ lot number: see front"

Source: ICF

Figure A6.17 Pre-prepared fruit / vegetables (salad): date mark and wording together on label on back of bag

Wording: "Należy spożyć do"; Translation: "Use by"

Source: ICF

Figure A6.18 Sauce: date mark on lid

Source: ICF

Figure A6.19 Sauce: date wording on label on back of squeezy bottle

Wording: "Bäst före: se lock." (Swedish); "Mindst holdbar til: se kapseln" (Danish); "Parasta ennen: katso korkki" (Finnish); Translation: "Best before: see lid".

Source: ICF

Figure A6.20 Sliced ham: date mark and wording together on film lid

Wording: "Consumir preferentemente antes del/ Lote: (ver envase)"

Translation: Best before/ Lot [number]: see packaging

[Original wording in English adjacent to date of 16/10/17: BEST BEFORE.

The other date shown (19/04/17) is a batch production date]

Source: ICF

Figure A6.21 Yoghurt – single pot: date mark on foil lid of pot

Source: ICF

Figure A6.22 Yoghurt – single pot: date wording on side of pot

Wording: "Spotrebujte do dátamu vzynačeného na viečku";

Translation: Use by the date shown on the lid

Source: ICF

Figure A6.23 Yoghurt – four-pack: date mark on foil lid of each individual pot

Source: ICF

Figure A6.24 Yoghurt – four-pack: date wording on side of individual pot

Wording: "Należy spożyć do: data na wieczku"

Translation: Use by date on lid

Source: ICF

Figure A6.25 Yoghurt - four-pack: date mark and wording together on foil lid of each pot

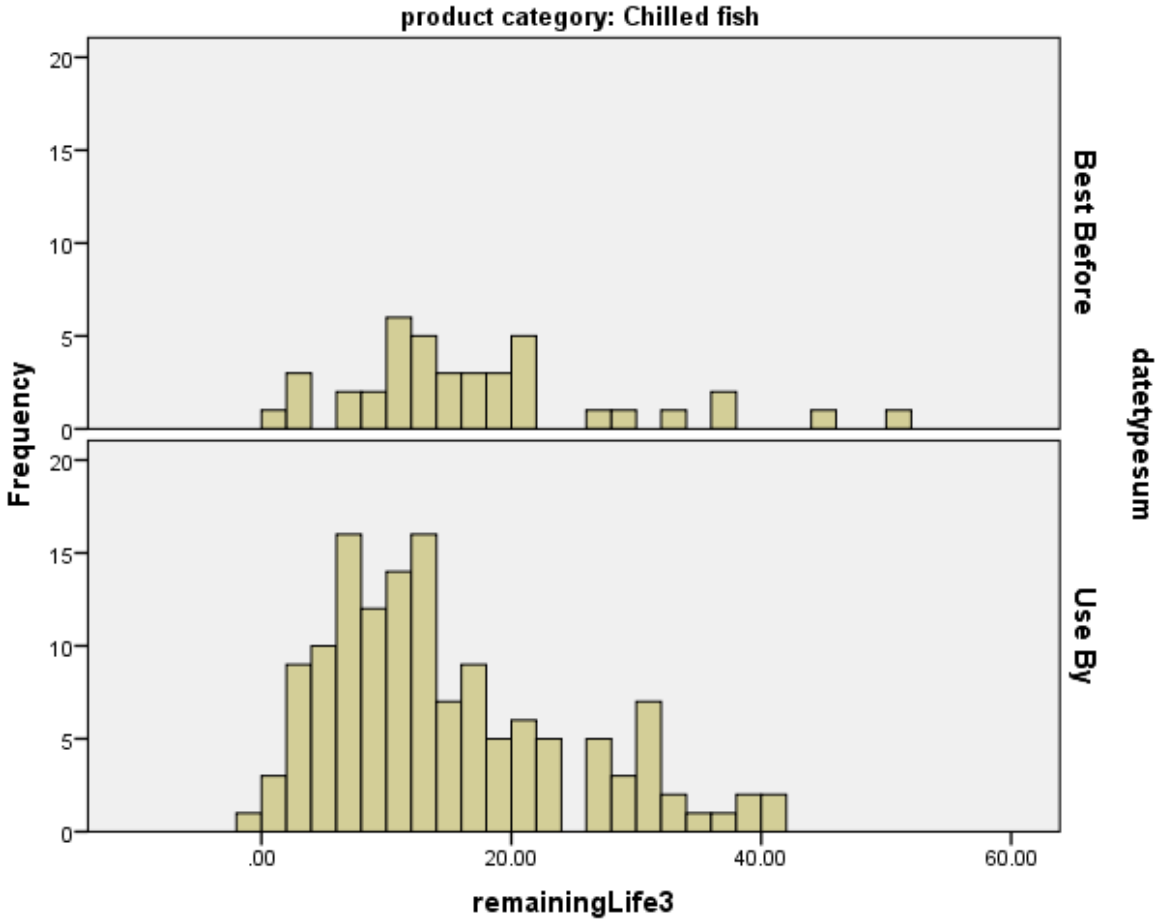
Wording: "FECHA DE CADUCIDAD";

Translation: Use by

Source: ICF

Annex 7 Remaining life analysis

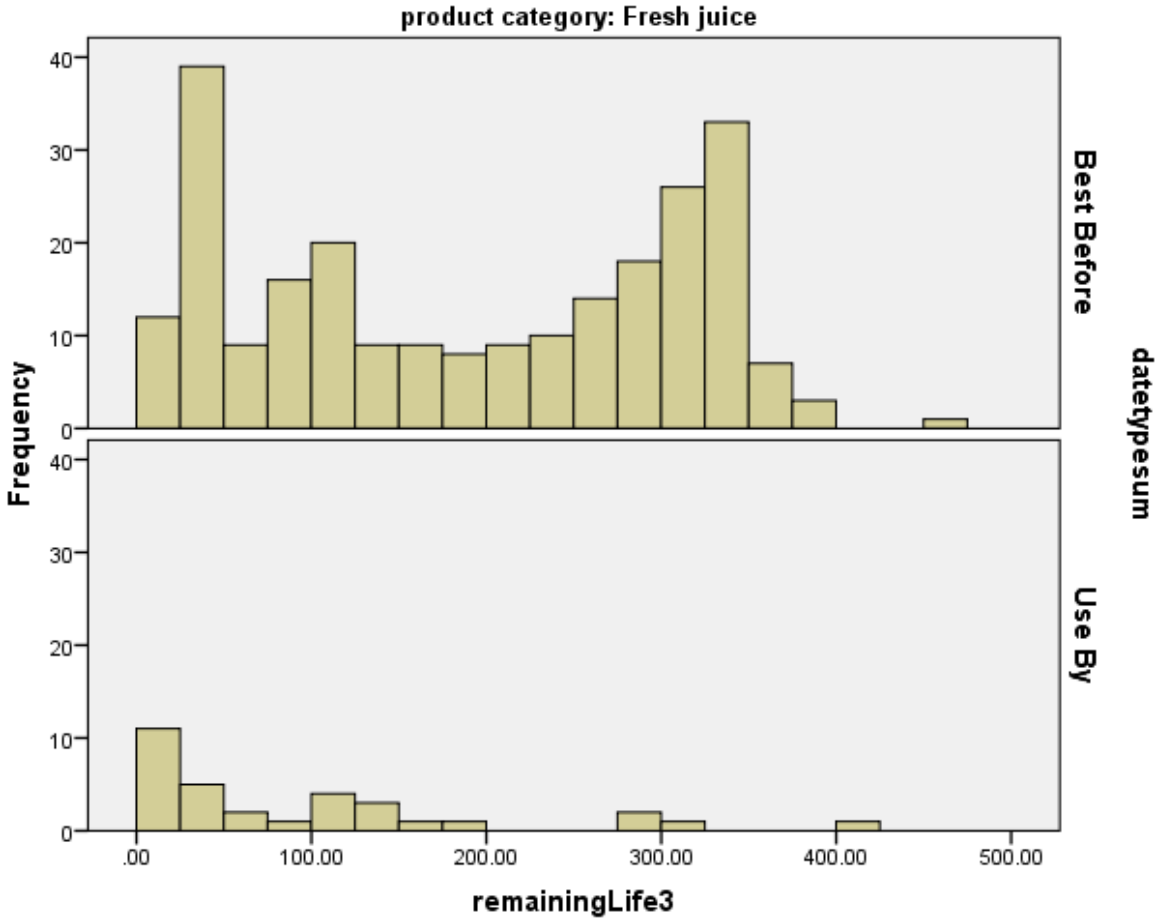
Figure A7.1 Remaining life for chilled fish



Source: ICF

Note: The x axis (labelled "remainingLife3") shows the remaining life in days. The y axis (labelled "Frequency") shows the number of products bought. The upper chart provides data for items carrying a "best before" label and the lower chart for items carrying a "use by" label.

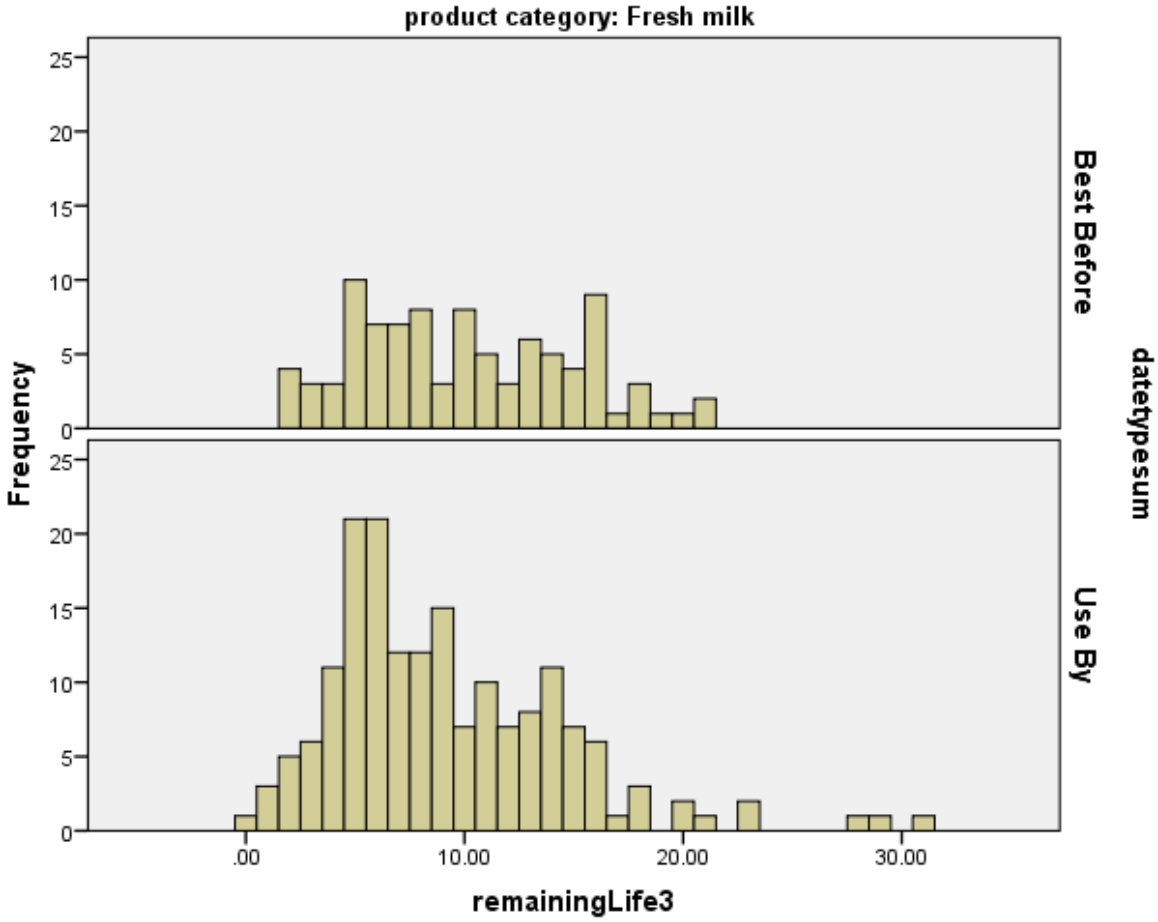
Figure A7.2 Remaining life for fresh juice



Source: ICF

Note: The x axis (labelled "remainingLife3") shows the remaining life in days. The y axis (labelled "Frequency") shows the number of products bought. The upper chart provides data for items carrying a "best before" label and the lower chart for items carrying a "use by" label.

Figure A7.3 Remaining life for fresh milk



Source: ICF

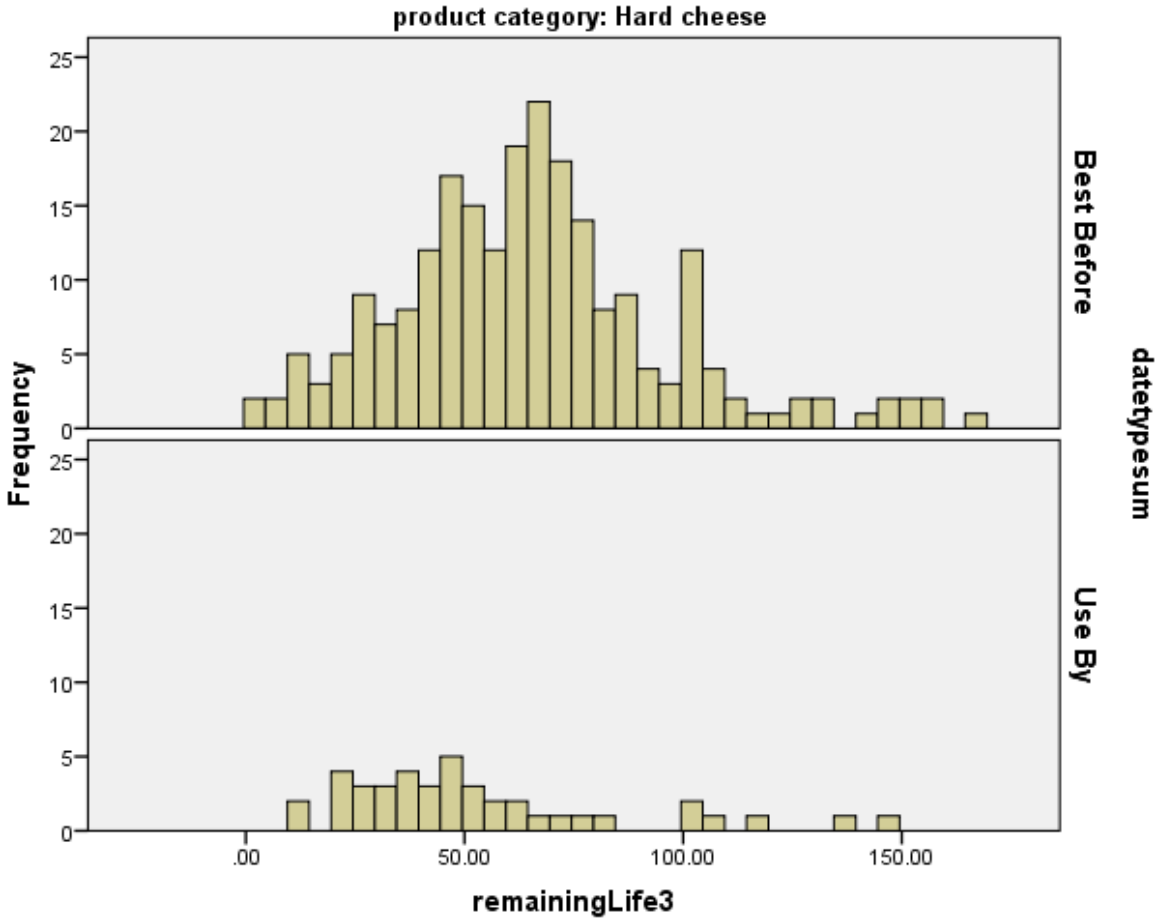
Note: The x axis (labelled "remainingLife3") shows the remaining life in days. The y axis (labelled "Frequency") shows the number of products bought. The upper chart provides data for items carrying a "best before" label and the lower chart for items carrying a "use by" label.

Table A7.1 Remaining life of milk by type of treatment

Level of milk treatment	Mean	N
Low pasteurized	8.3081	211
Homogenized pasteurized micro-filtered	11.8654	52
Higher level of pasteurization, (but not UHT milk)	16.7692	13
Total	9.3768	276

Source: ICF

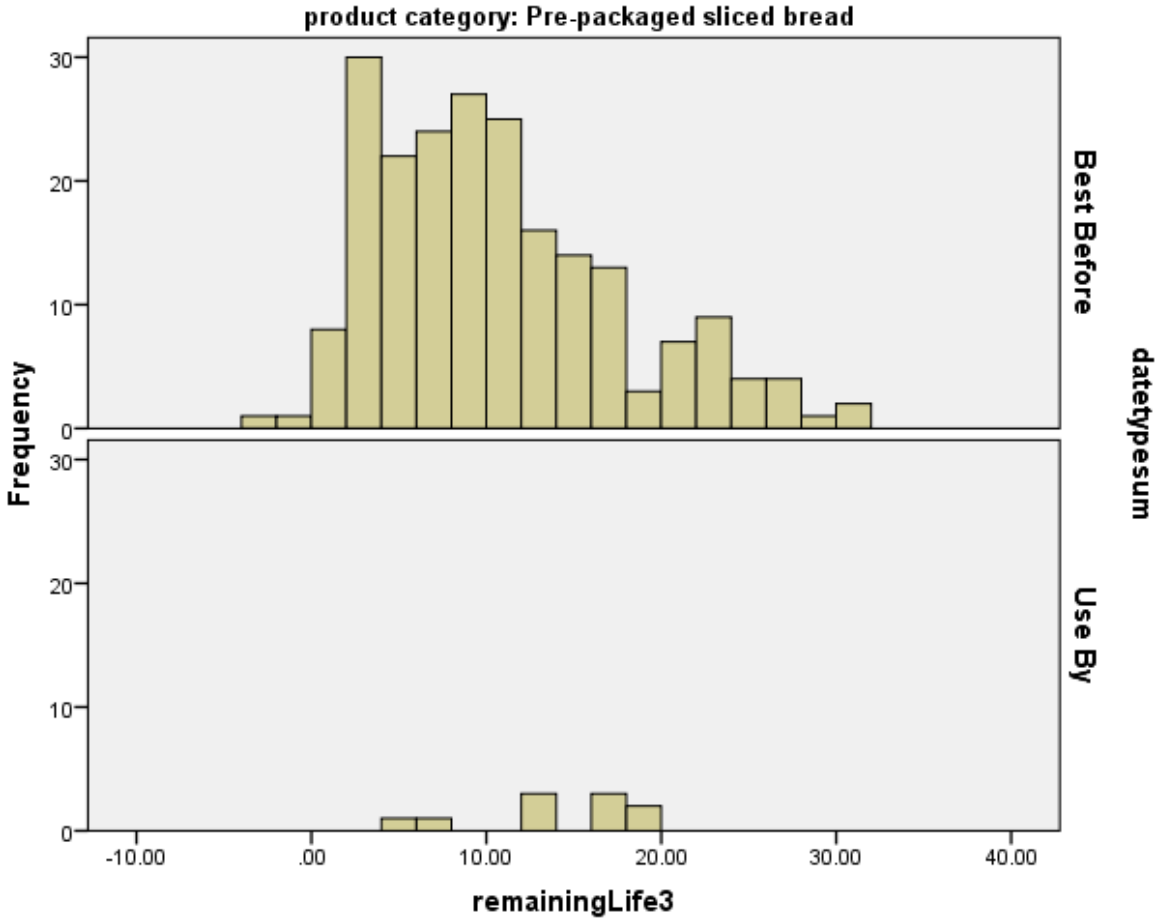
Figure A7.4 Remaining life for hard cheese



Source: ICF

Note: The x axis (labelled "remainingLife3") shows the remaining life in days. The y axis (labelled "Frequency") shows the number of products bought. The upper chart provides data for items carrying a "best before" label and the lower chart for items carrying a "use by" label.

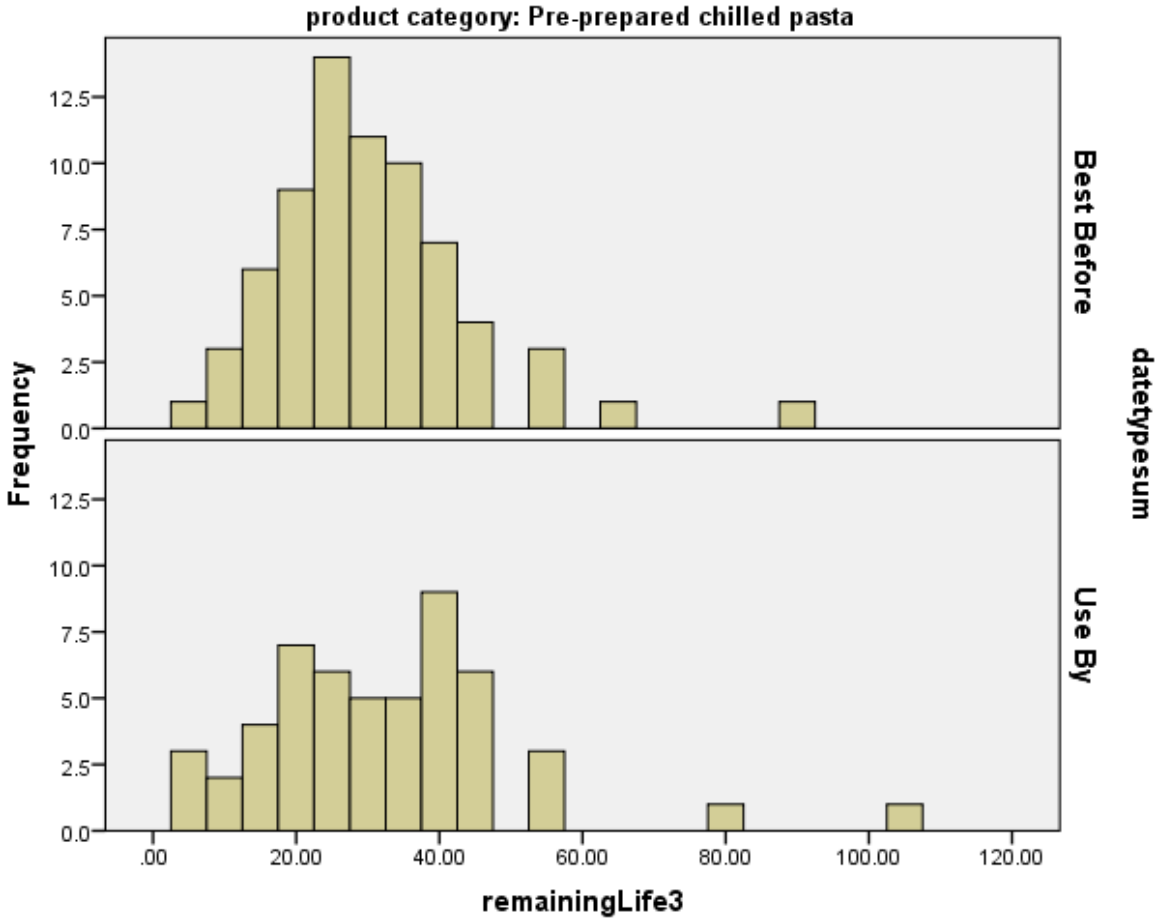
Figure A7.5 Remaining life for pre-packaged sliced bread



Source: ICF

Note: The x axis (labelled "remainingLife3") shows the remaining life in days. The y axis (labelled "Frequency") shows the number of products bought. The upper chart provides data for items carrying a "best before" label and the lower chart for items carrying a "use by" label.

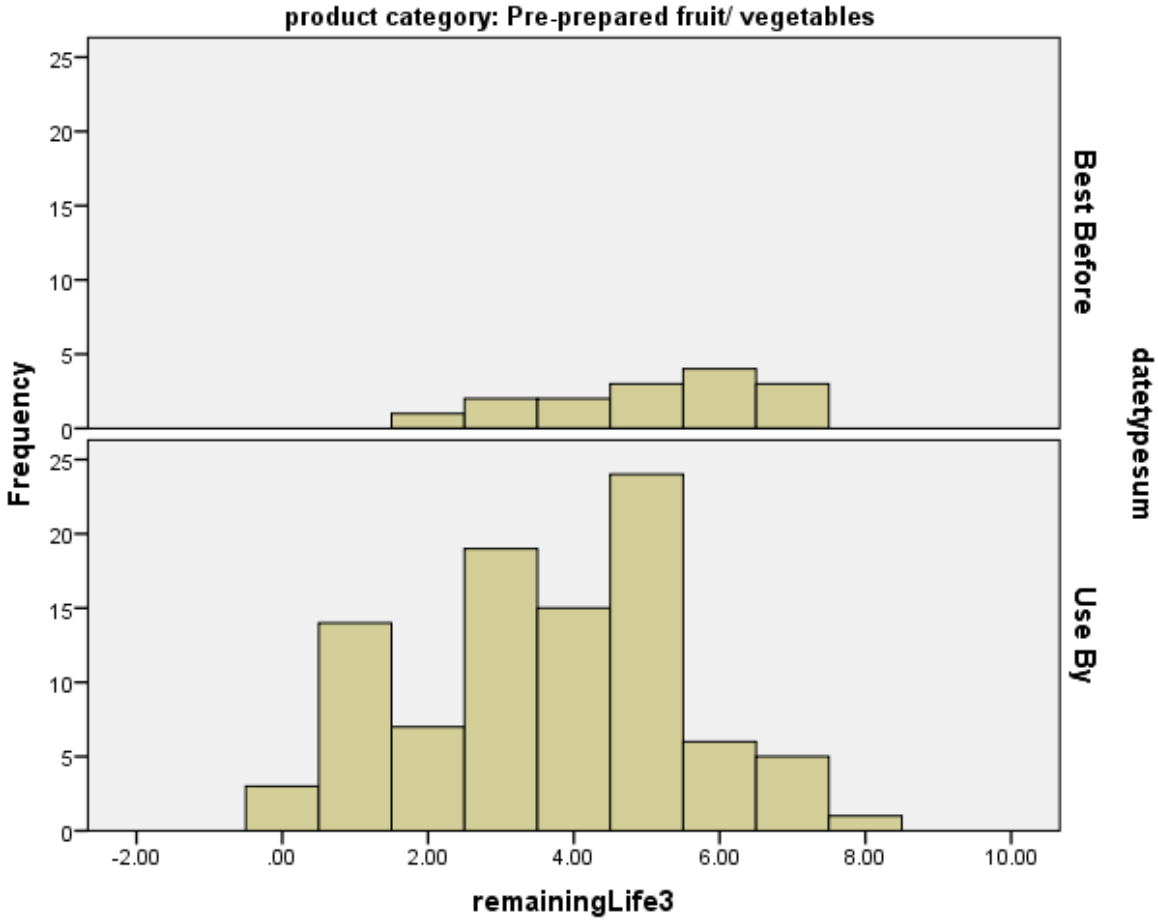
Figure A7.6 Remaining life for chilled pasta



Source: ICF

Note: The x axis (labelled "remainingLife3") shows the remaining life in days. The y axis (labelled "Frequency") shows the number of products bought. The upper chart provides data for items carrying a "best before" label and the lower chart for items carrying a "use by" label.

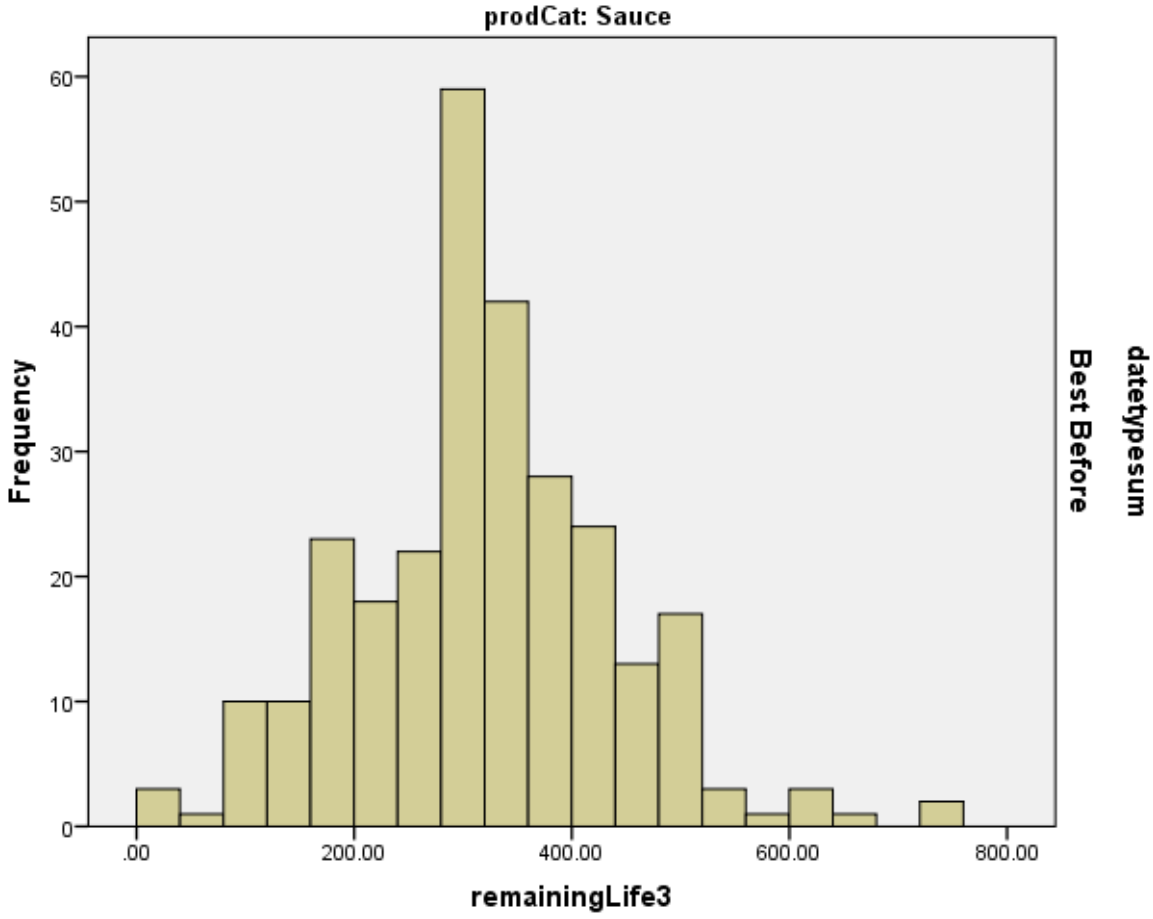
Figure A7.7 Remaining life for pre-prepared fruit/ vegetables



Source: ICF

Note: The x axis (labelled "remainingLife3") shows the remaining life in days. The y axis (labelled "Frequency") shows the number of products bought. The upper chart provides data for items carrying a "best before" label and the lower chart for items carrying a "use by" label.

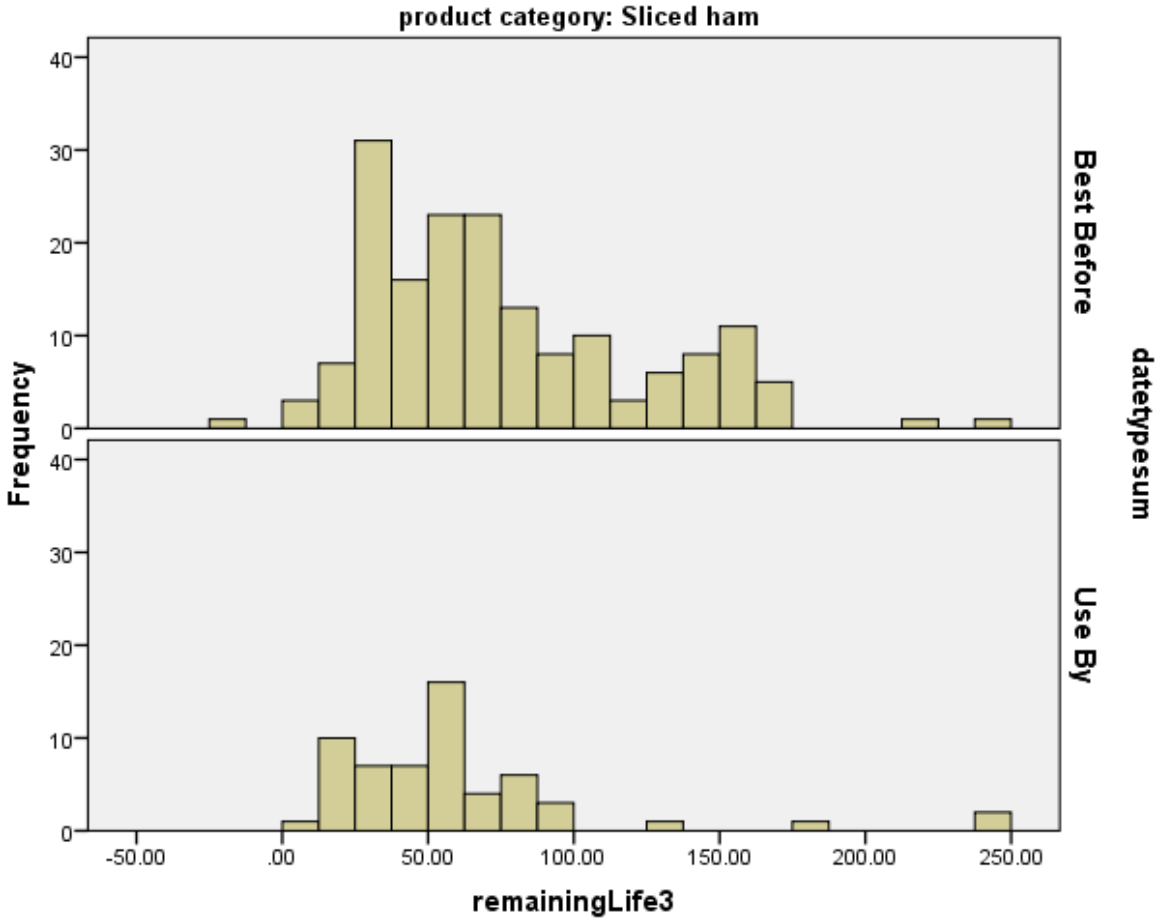
Figure A7.8 Remaining life for sauce



Source: ICF

Note: The x axis (labelled "remainingLife3") shows the remaining life in days. The y axis (labelled "Frequency") shows the number of products bought. The upper chart provides data for items carrying a "best before" label and the lower chart for items carrying a "use by" label.

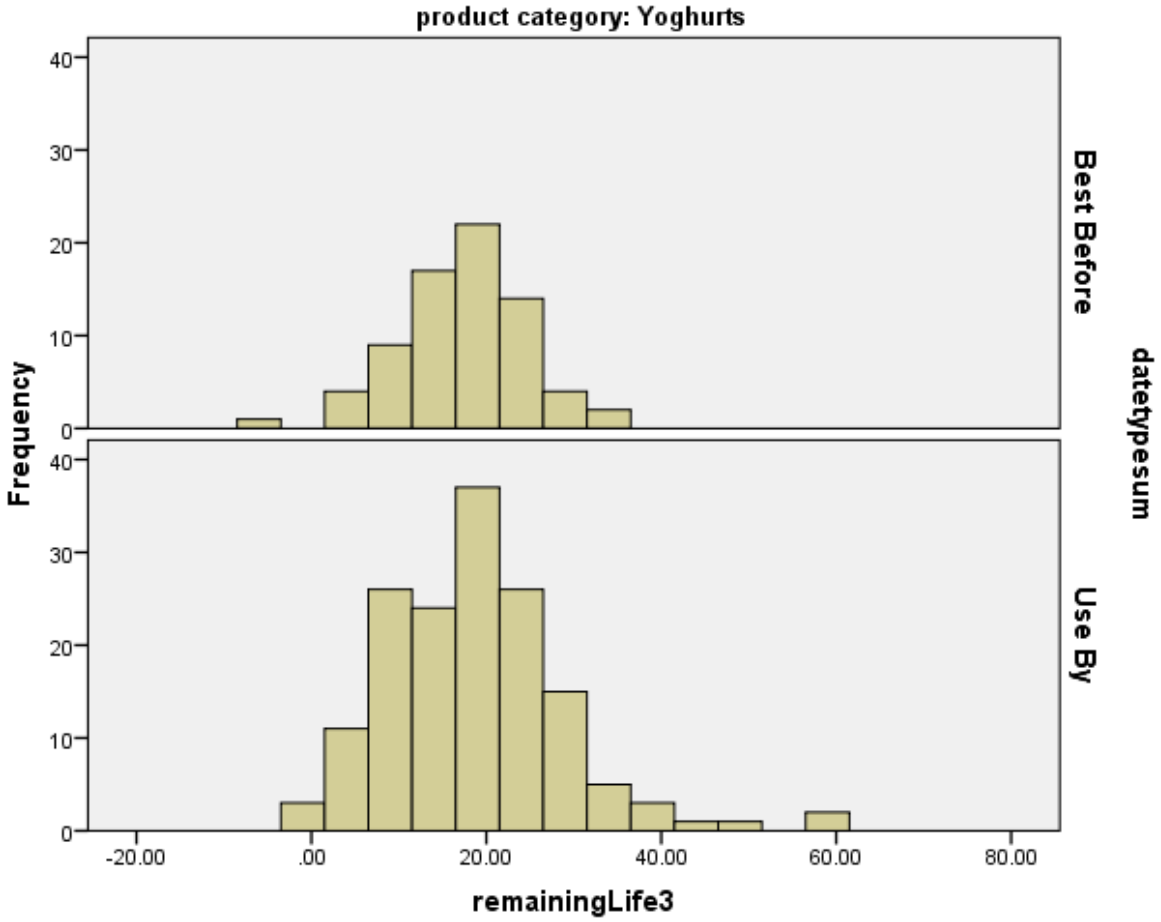
Figure A7.9 Remaining life for sliced ham



Source: ICF

Note: The x axis (labelled "remainingLife3") shows the remaining life in days. The y axis (labelled "Frequency") shows the number of products bought. The upper chart provides data for items carrying a "best before" label and the lower chart for items carrying a "use by" label.

Figure A7.10 Remaining life for yoghurt



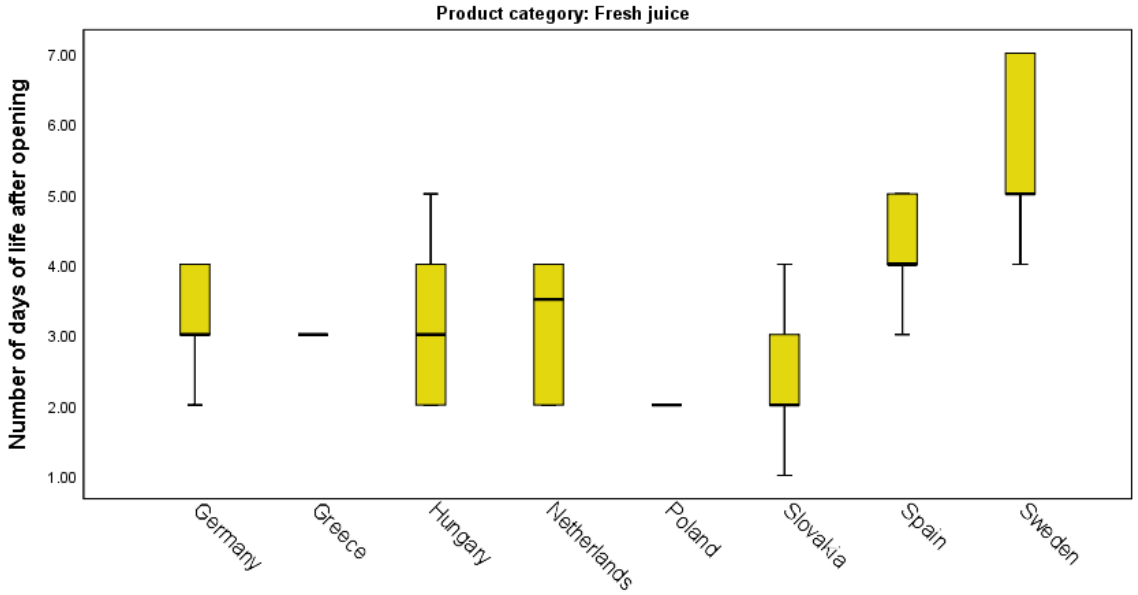
Source: ICF

Note: The x axis (labelled "remainingLife3") shows the remaining life in days. The y axis (labelled "Frequency") shows the number of products bought. The upper chart provides data for items carrying a "best before" label and the lower chart for items carrying a "use by" label.

Annex 8 Variations in open life for selected products

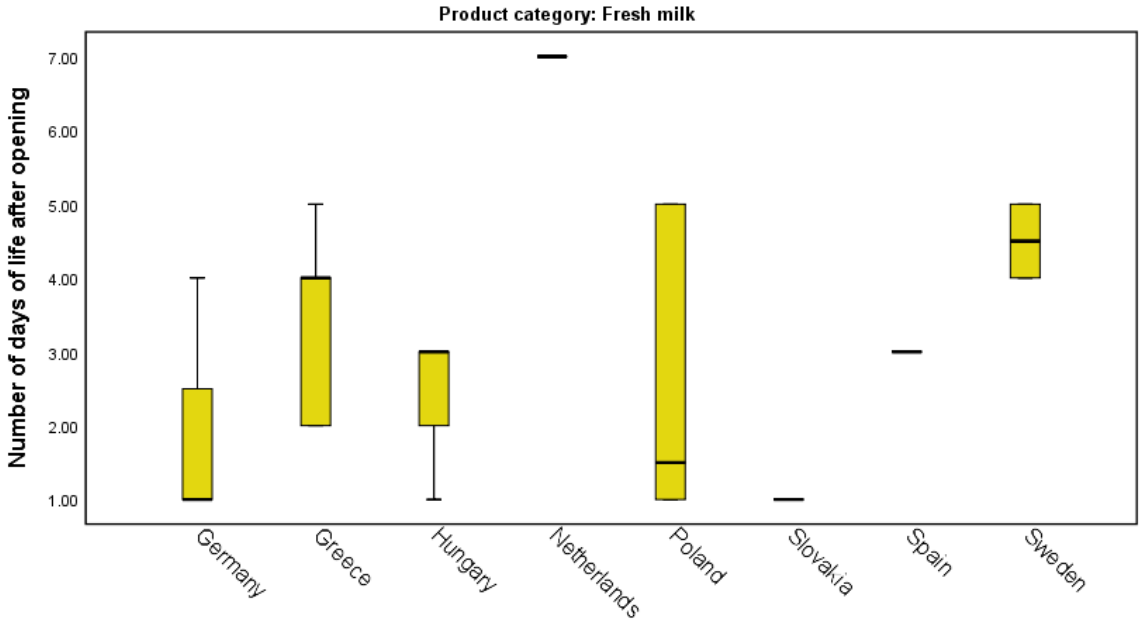
The following figures show ranges of open life of product types that exhibit country-to-country variation in open life: fresh juice, fresh milk hard cheese and sauce[7].

Figure A8.1 Fresh juice: number of days of open life across by Member States



Source: ICF

Figure A8.2 Fresh milk: number of days of open life across by Member States

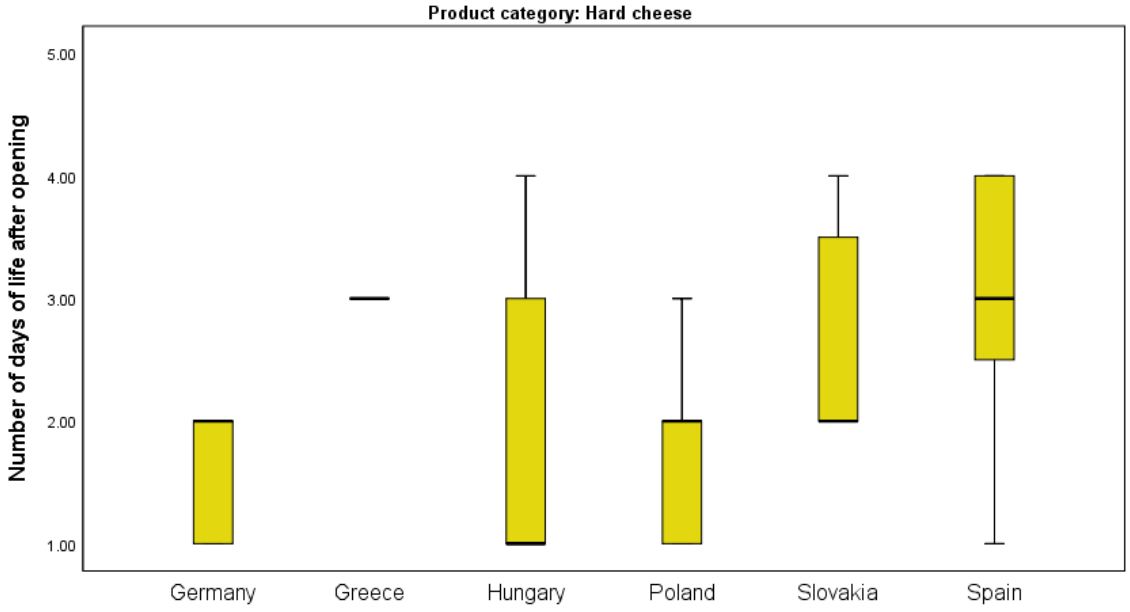


Source: ICF

[7] Particularly high values for open life were found for sauce purchased in Slovakia

Figure A8.3 Hard cheese: number of days of open life across by Member States

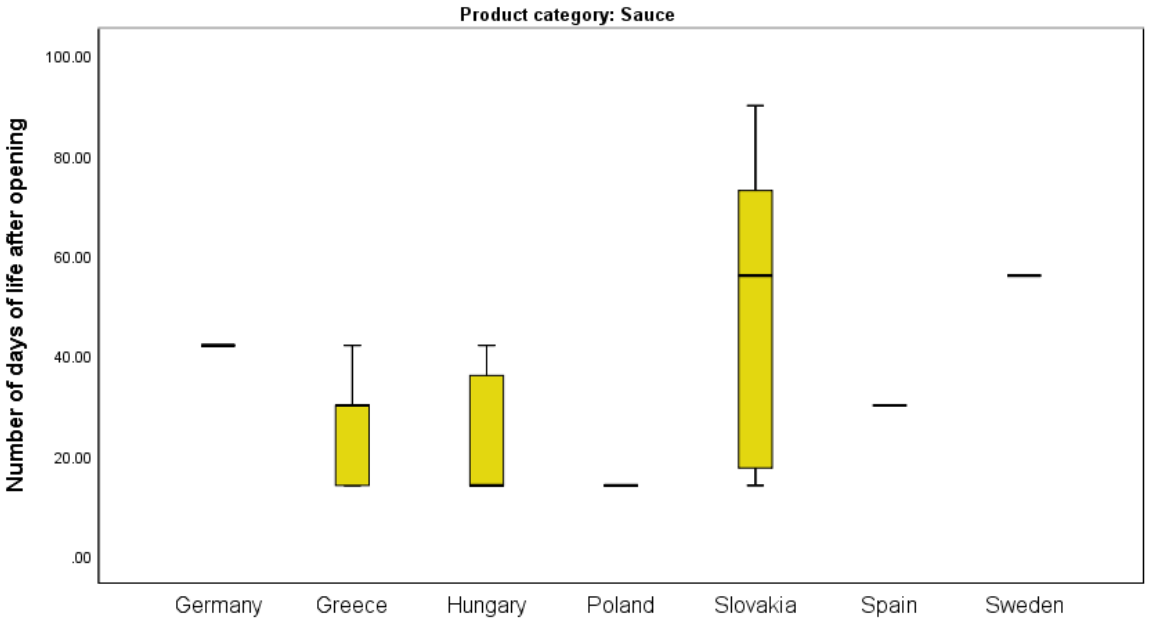
(NB: no open life advice was found on hard cheese purchased in the Netherlands or Sweden)



Source: ICF

Figure A8.4 Sauce: number of days of open life across by Member States

(NB: no open life advice was found on sauce purchased in the Netherlands)



Source: ICF

Annex 9 On-pack storage advice

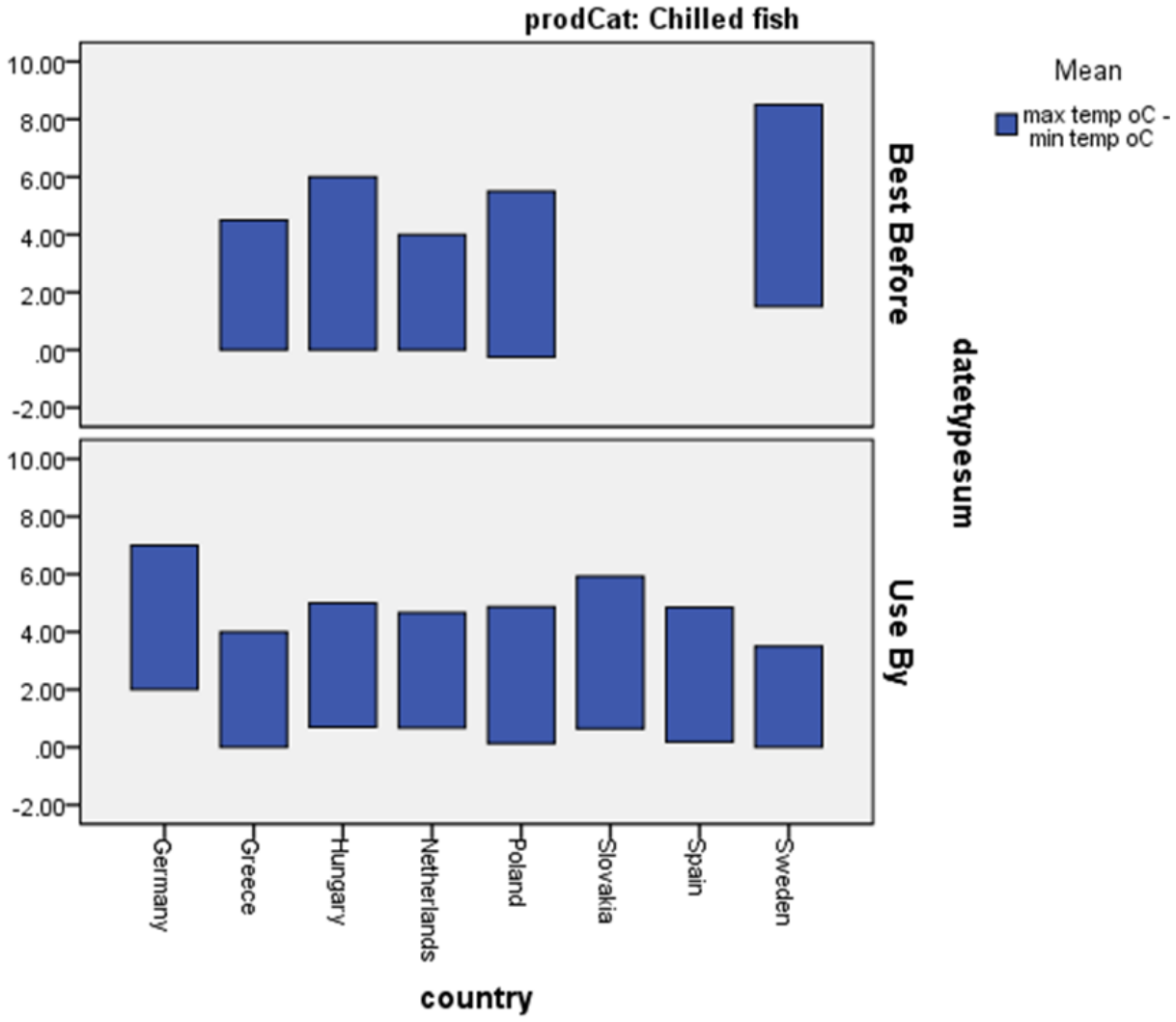
Chilled fish

Table A9.1 Chilled fish: storage advice/ temperature by Member State

Storage advice and temperature	DE	EL	HU	NL	PL	SK	ES	SE	Total
Temp range not directly linked to date mark (number and %)	1	12	9	2	35	13	28	7	107
	2.9%	66.7%	56.3%	12.5%	89.7%	86.7%	90.3%	38.9%	57.2%
Max storage temp as a condition related to date mark (number & %)	30	0	1	12	0	1	0	0	44
	88.2%	0.0%	6.3%	75.0%	0.0%	6.7%	0.0%	0.0%	23.5%
Store refrigerated, no temperature advised (number & %)	0	0	0	0	0	0	2	8	10
	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.5%	44.4%	5.3%
Both temp range & max temp as conditions linked to date mark (number & %)	0	0	0	2	1	0	0	0	3
	0.0%	0.0%	0.0%	12.5%	2.6%	0.0%	0.0%	0.0%	1.6%
Max temp not directly linked to date mark (number & %)	0	3	0	0	3	1	1	3	11
	0.0%	16.7%	0.0%	0.0%	7.7%	6.7%	3.2%	16.7%	5.9%
Temp range as condition directly linked to date mark (number and %)	1	0	0	0	0	0	0	0	1
	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%
No temp storage advice given (number and %)	1	3	1	0	0	0	0	0	5
	2.9%	16.7%	6.3%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%
Protect from heat (number and %)	1	0	5	0	0	0	0	0	6
	2.9%	0.0%	31.3%	0.0%	0.0%	0.0%	0.0%	0.0%	3.2%
Total (number and %)	**34**	**18**	**16**	**16**	**39**	**15**	**31**	**18**	**187**
	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: ICF

Figure A9.1 Storage temperature ranges for chilled fish by Member State



Source: ICF

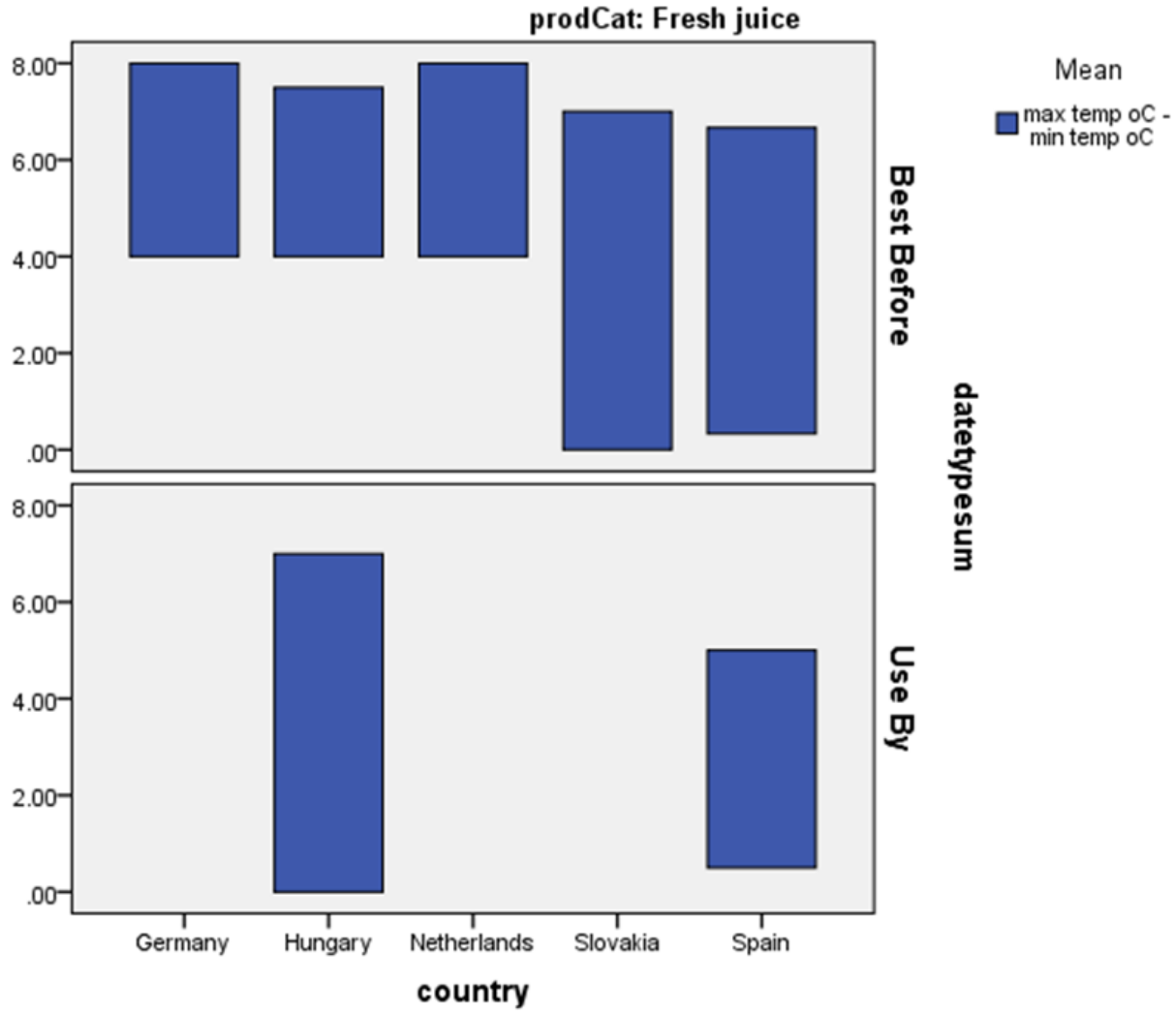
Fresh juice

Table A9.2 Fresh juice: storage advice/ temperature by Member State

Storage advice and temperature	DE	EL	HU	NL	PL	SK	ES	SE	Total
Temp range not directly linked to date mark (number and %)	0	0	4	1	0	2	8	0	15
	0.0%	0.0%	7.8%	5.3%	0.0%	7.4%	38.1%	0.0%	5.2%
Max storage temp as a condition related to date mark (number & %)	0	0	0	16	0	0	0	0	16
	0.0%	0.0%	0.0%	84.2%	0.0%	0.0%	0.0%	0.0%	5.6%
Store refrigerated, no temperature advised (number & %)	38	57	46	2	49	25	13	13	243
	97.4%	96.6%	90.2%	10.5%	98.0%	92.6%	61.9%	65.0%	85.0%
Temp range as condition directly linked to date mark (number and %)	1	0	1	0	0	0	0	7	9
	2.6%	0.0%	2.0%	0.0%	0.0%	0.0%	0.0%	35.0%	3.1%
No temp storage advice given (number and %)	0	2	0	0	1	0	0	0	3
	0.0%	3.4%	0.0%	0.0%	2.0%	0.0%	0.0%	0.0%	1.0%
Total (number and %)	**39**	**59**	**51**	**19**	**50**	**27**	**21**	**20**	**286**
	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: ICF

Figure A9.2 Storage temperature ranges for fresh juice by Member State



Source: ICF

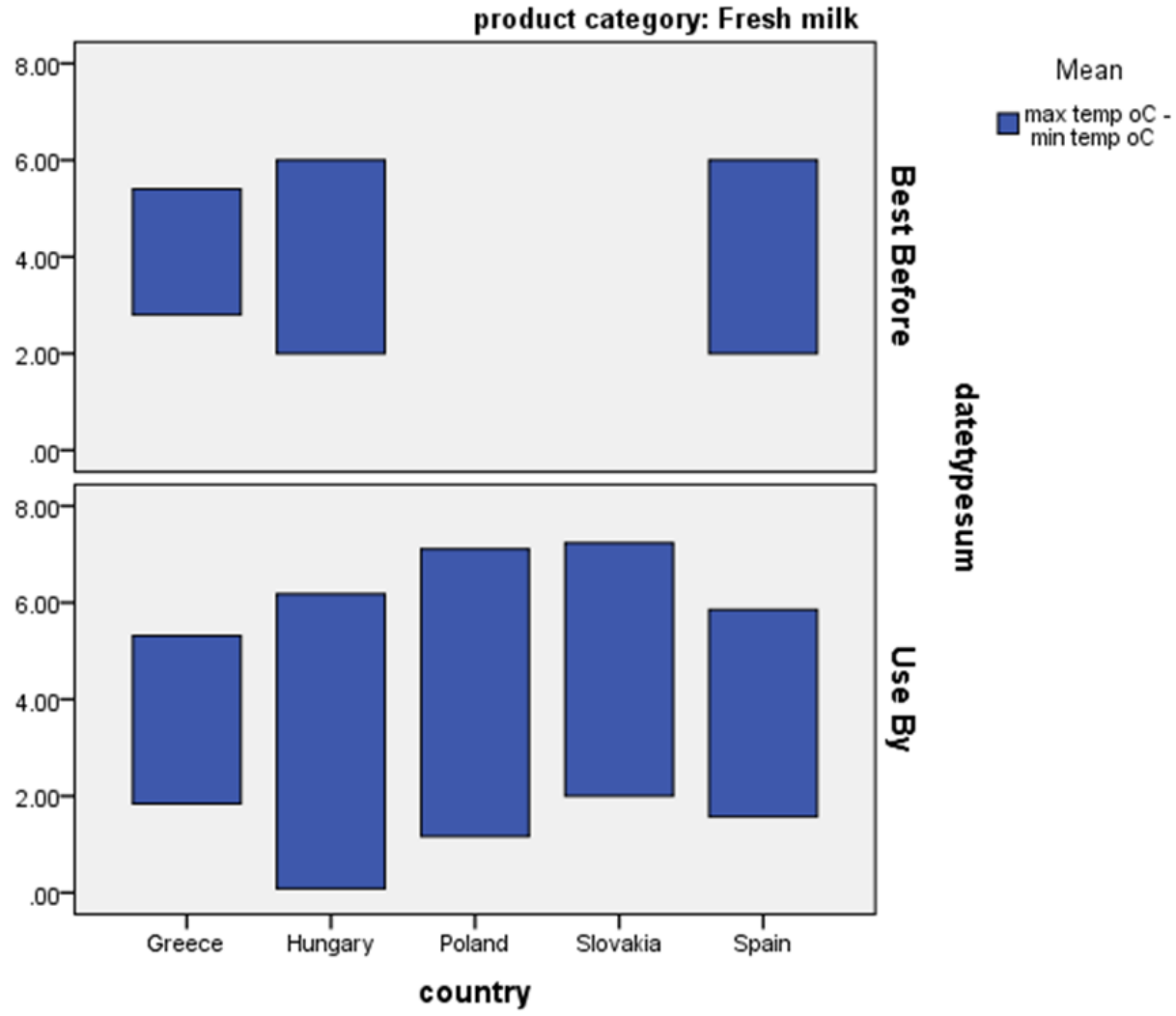
Fresh milk

Table A9.3 Fresh milk: storage advice/ temperature by Member State

Storage advice and temperature	DE	EL	HU	NL	PL	SK	ES	SE	Total
Temp range not directly linked to date mark (number and %)	0	29	36	0	54	21	16	0	156
	0.0%	52.7%	73.5%	0.0%	96.4%	100.0%	94.1%	0.0%	56.3%
Max storage temp as a condition related to date mark (number & %)	29	1	0	6	0	0	0	0	36
	93.5%	1.8%	0.0%	23.1%	0.0%	0.0%	0.0%	0.0%	13.0%
Store refrigerated, no temperature advised (number & %)	2	7	0	1	2	0	1	15	28
	6.5%	12.7%	0.0%	3.8%	3.6%	0.0%	5.9%	68.2%	10.1%
Max temperature: not directly linked to date mark (number and %)	0	0	3	19	0	0	0	7	29
	0.0%	0.0%	6.1%	73.1%	0.0%	0.0%	0.0%	31.8%	10.5%
Temp range as condition directly linked to date mark (number and %)	0	17	10	0	0	0	0	0	27
	0.0%	30.9%	20.4%	0.0%	0.0%	0.0%	0.0%	0.0%	9.7%
No temp storage advice given (number and %)	0	1	0	0	0	0	0	0	1
	0.0%	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
Total (number and %)	**31**	**55**	**49**	**26**	**56**	**21**	**17**	**22**	**277**
	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: ICF

Figure A9.3 Storage temperature ranges for fresh milk by Member State



Source: ICF

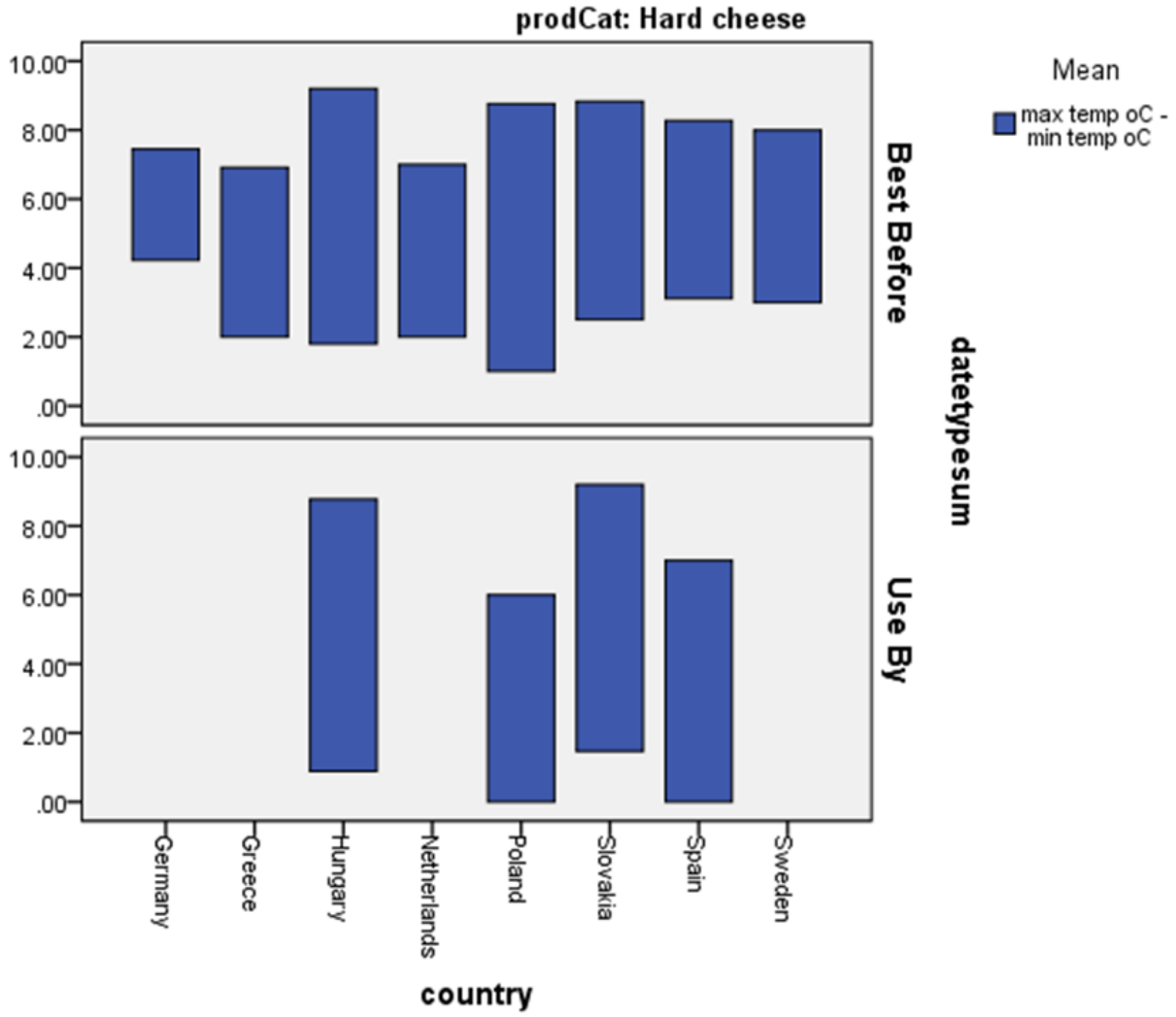
Hard cheese

Table A9.4 Hard cheese: storage advice/ temperature by Member State

Storage advice and temperature	DE	EL	HU	NL	PL	SK	ES	SE	Total
Temp range not directly linked to date mark (number and %)	0	15	18	2	60	27	20	2	144
	0.0%	53.6%	54.5%	7.1%	93.8%	84.4%	90.9%	6.5%	51.2%
Max storage temp as a condition related to date mark (number & %)	32	0	0	2	0	0	0	0	34
	74.4%	0.0%	0.0%	7.1%	0.0%	0.0%	0.0%	0.0%	12.1%
Single storage temperature, not linked to date mark (number & %)	0	0	0	0	0	0	1	0	1
	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.5%	0.0%	0.4%
Store refrigerated, no temperature advised (number & %)	1	12	0	2	1	0	0	15	31
	2.3%	42.9%	0.0%	7.1%	1.6%	0.0%	0.0%	48.4%	11.0%
Max temperature: not directly linked to date mark (number and %)	0	1	0	22	1	4	1	14	43
	0.0%	3.6%	0.0%	78.6%	1.6%	12.5%	4.5%	45.2%	15.3%
Temp range as condition directly linked to date mark (number and %)	9	0	15	0	0	0	0	0	24
	20.9%	0.0%	45.5%	0.0%	0.0%	0.0%	0.0%	0.0%	8.5%
No temp storage advice given (number and %)	1	0	0	0	2	1	0	0	4
	2.3%	0.0%	0.0%	0.0%	3.1%	3.1%	0.0%	0.0%	1.4%
Total (number and %)	**43**	**28**	**33**	**28**	**64**	**32**	**22**	**31**	**281**
	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: ICF

Figure A9.4 Storage temperature ranges for hard cheese by Member State



Source: ICF

Pre-packaged sliced bread

Table A9.5 Pre-packaged sliced bread: storage advice/ temperature by Member State

Storage advice and temperature	DE	EL	HU	NL	PL	SK	ES	SE	Total
Store refrigerated, no temperature advised (number & %)	0	31	0	0	0	0	0	0	31
	0.0%	58.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.5%
No temp storage advice given (number and %)	29	6	4	9	3	15	4	15	85
	82.9%	11.3%	19.0%	81.8%	5.3%	75.0%	14.8%	62.5%	34.3%
Store at room temperature (number & %)	1	0	1	2	42	3	0	5	54
	2.9%	0.0%	4.8%	18.2%	73.7%	15.0%	0.0%	20.8%	21.8%
Protect from heat (number & %)	4	0	0	0	0	1	0	0	5
	11.4%	0.0%	0.0%	0.0%	0.0%	5.0%	0.0%	0.0%	2.0%
Store in a cool place, no temperature advised (number and %)	1	10	16	0	12	1	23	4	67
	2.9%	18.9%	76.2%	0.0%	21.1%	5.0%	85.2%	16.7%	27.0%
Store in a cool place but not refrigerated (number and %)	0	6	0	0	0	0	0	0	6
	0.0%	11.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.4%
Total (number and %)	**35**	**53**	**21**	**11**	**57**	**20**	**27**	**24**	**248**
	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: ICF

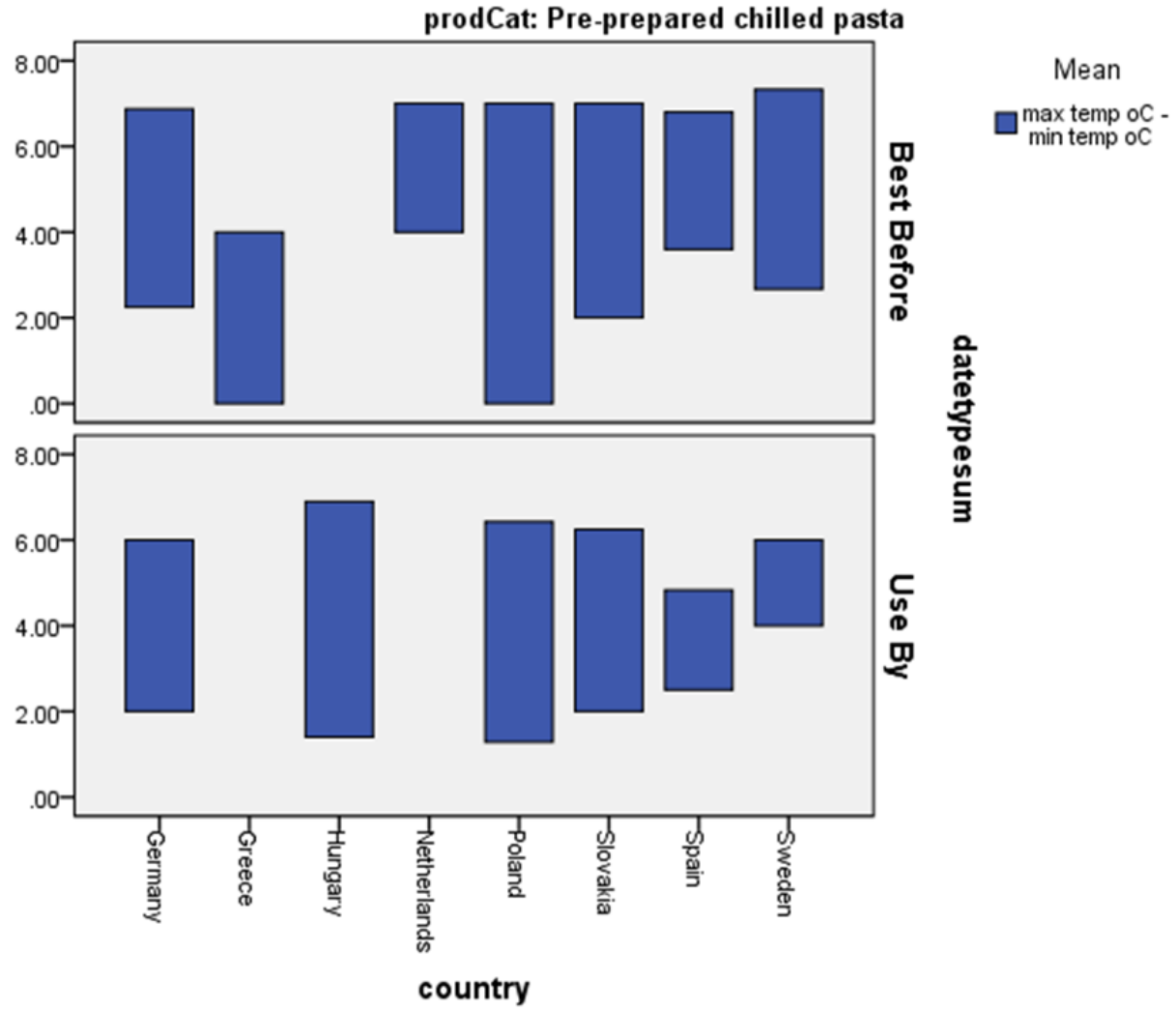
Pre-prepared chilled pasta

Table A9.6 Pre-prepared chilled pasta: storage advice/ temperature by Member State

Storage advice and temperature	DE	EL	HU	NL	PL	SK	ES	SE	Total
Temp range not directly linked to date mark (number and %)	0	2	5	1	10	6	18	4	46
	0.0%	50.0%	45.5%	10.0%	76.9%	75.0%	64.3%	18.2%	35.9%
Max storage temp as a condition related to date mark (number & %)	22	0	0	2	0	0	0	1	25
	68.8%	0.0%	0.0%	20.0%	0.0%	0.0%	0.0%	4.5%	19.5%
Single storage temperature, not linked to date mark (number & %)	0	0	1	0	0	0	4	0	5
	0.0%	0.0%	9.1%	0.0%	0.0%	0.0%	14.3%	0.0%	3.9%
Store refrigerated, no temperature advised (number & %)	0	2	0	0	1	0	2	10	15
	0.0%	50.0%	0.0%	0.0%	7.7%	0.0%	7.1%	45.5%	11.7%
Max temp not directly linked to date mark (number & %)	0	0	0	6	1	1	3	7	18
	0.0%	0.0%	0.0%	60.0%	7.7%	12.5%	10.7%	31.8%	14.1%
Temp range as condition directly linked to date mark (number and %)	9	0	1	0	0	0	0	0	10
	28.1%	0.0%	9.1%	0.0%	0.0%	0.0%	0.0%	0.0%	7.8%
No temp storage advice given (number and %)	1	0	0	1	1	1	1	0	5
	3.1%	0.0%	0.0%	10.0%	7.7%	12.5%	3.6%	0.0%	3.9%
Protect from heat (number and %)	0	0	4	0	0	0	0	0	4
	0.0%	0.0%	36.4%	0.0%	0.0%	0.0%	0.0%	0.0%	3.1%
Total (number and %)	**32**	**4**	**11**	**10**	**13**	**8**	**28**	**22**	**128**
	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: ICF

Figure A9.5 Storage temperature ranges for pre-prepared chilled pasta by MS



Source: ICF

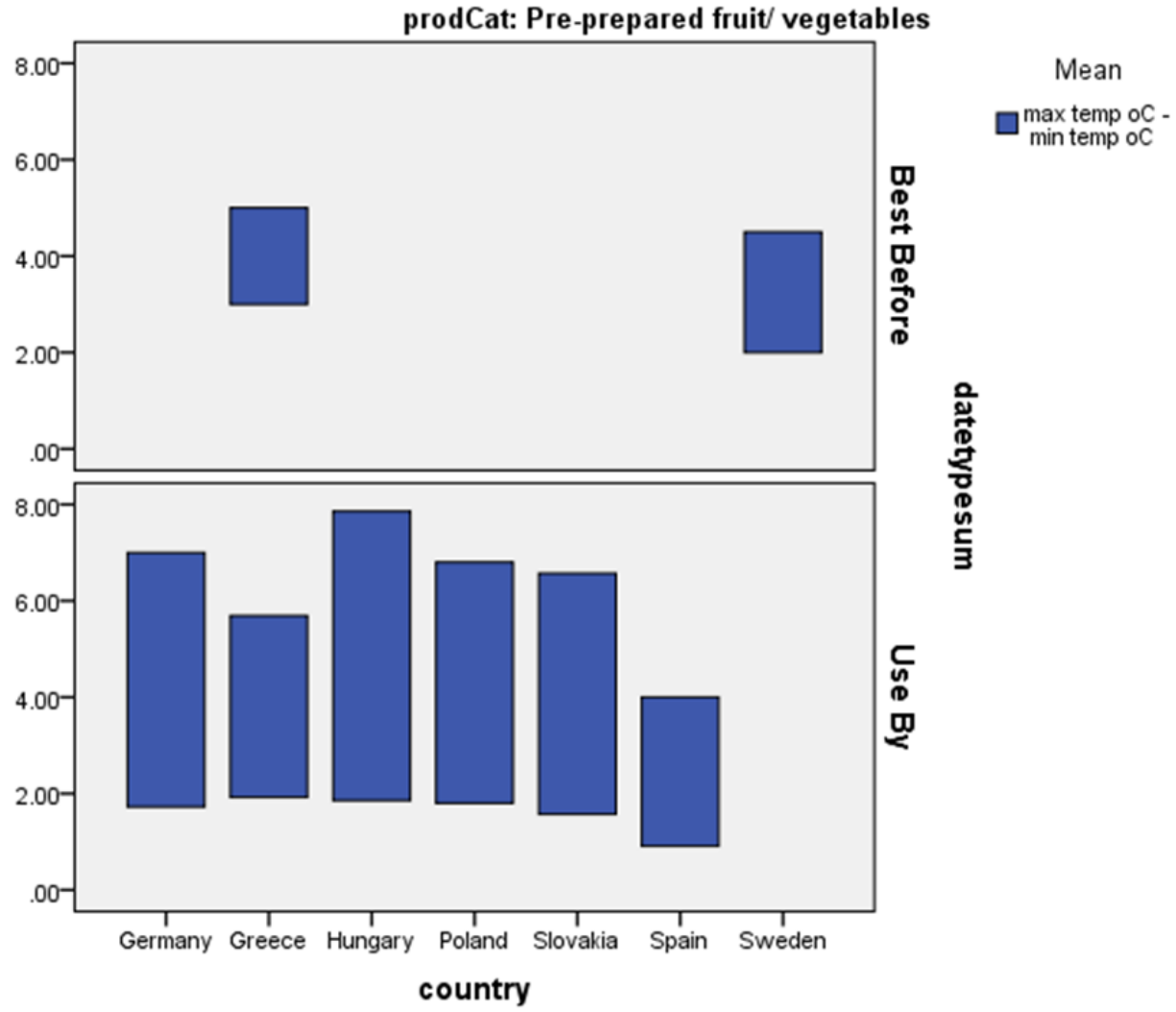
Pre-prepared fruit / vegetables

Table A9.7 Pre-prepared fruit/vegetables: storage advice/ temperature by Member State

Storage advice and temperature	DE	EL	HU	NL	PL	SK	ES	SE	Total
Temp range not directly linked to date mark (number and %)	5	14	7	0	18	7	22	3	76
	19.2%	77.8%	87.5%	0.0%	81.8%	53.8%	100.0%	20.0%	55.9%
Max storage temp as a condition related to date mark (number & %)	3	0	0	4	0	0	0	0	7
	11.5%	0.0%	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	5.1%
Store refrigerated, no temperature advised (number & %)	0	3	0	0	2	0	0	11	16
	0.0%	16.7%	0.0%	0.0%	9.1%	0.0%	0.0%	73.3%	11.8%
Max temp not directly linked to date mark (number & %)	0	1	1	8	2	2	0	0	14
	0.0%	5.6%	12.5%	66.7%	9.1%	15.4%	0.0%	0.0%	10.3%
Temp range as condition directly linked to date mark (number and %)	2	0	0	0	0	0	0	0	2
	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%
No temp storage advice given (number and %)	10	0	0	0	0	4	0	1	15
	38.5%	0.0%	0.0%	0.0%	0.0%	30.8%	0.0%	6.7%	11.0%
Protect from heat (number and %)	6	0	0	0	0	0	0	0	6
	23.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.4%
Total (number and %)	**26**	**18**	**8**	**12**	**22**	**13**	**22**	**15**	**136**
	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: ICF

Figure A9.6 Storage temperature ranges for pre-prepared fruit/ vegetables by MS



Source: ICF

Sauce

Table A9.8 Sauce (ketchup): storage advice/ temperature by Member State

Storage advice and temperature	DE	EL	HU	NL	PL	SK	ES	SE	Total
Temp range not directly linked to date mark (number and %)	0	0	2	0	2	5	0	0	9
	0.0%	0.0%	6.1%	0.0%	2.4%	15.2%	0.0%	0.0%	3.1%
Single storage temperature, not linked to date mark (number & %)	0	0	0	0	1	0	0	0	1
	0.0%	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.3%
Store refrigerated, no temperature advised (number & %)	26	22	27	25	75	18	30	20	243
	100.0%	100.0%	81.8%	86.2%	88.2%	54.5%	93.8%	76.9%	85.0%
Max temp not directly linked to date mark (number & %)	0	0	0	4	2	7	0	1	14
	0.0%	0.0%	0.0%	13.8%	2.4%	21.2%	0.0%	3.8%	4.9%
No temp storage advice given (number and %)	0	0	4	0	3	1	1	5	14
	0.0%	0.0%	12.1%	0.0%	3.5%	3.0%	3.1%	19.2%	4.9%
Store at room temperature (number & %)	0	0	0	0	1	0	0	0	1
	0.0%	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.3%
Store in a cool place, no temperature advised (number & %)	0	0	0	0	1	2	1	0	4
	0.0%	0.0%	0.0%	0.0%	1.2%	6.1%	3.1%	0.0%	1.4%
Total (number and %)	**26**	**22**	**33**	**29**	**85**	**33**	**32**	**26**	**286**
	100%	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: ICF

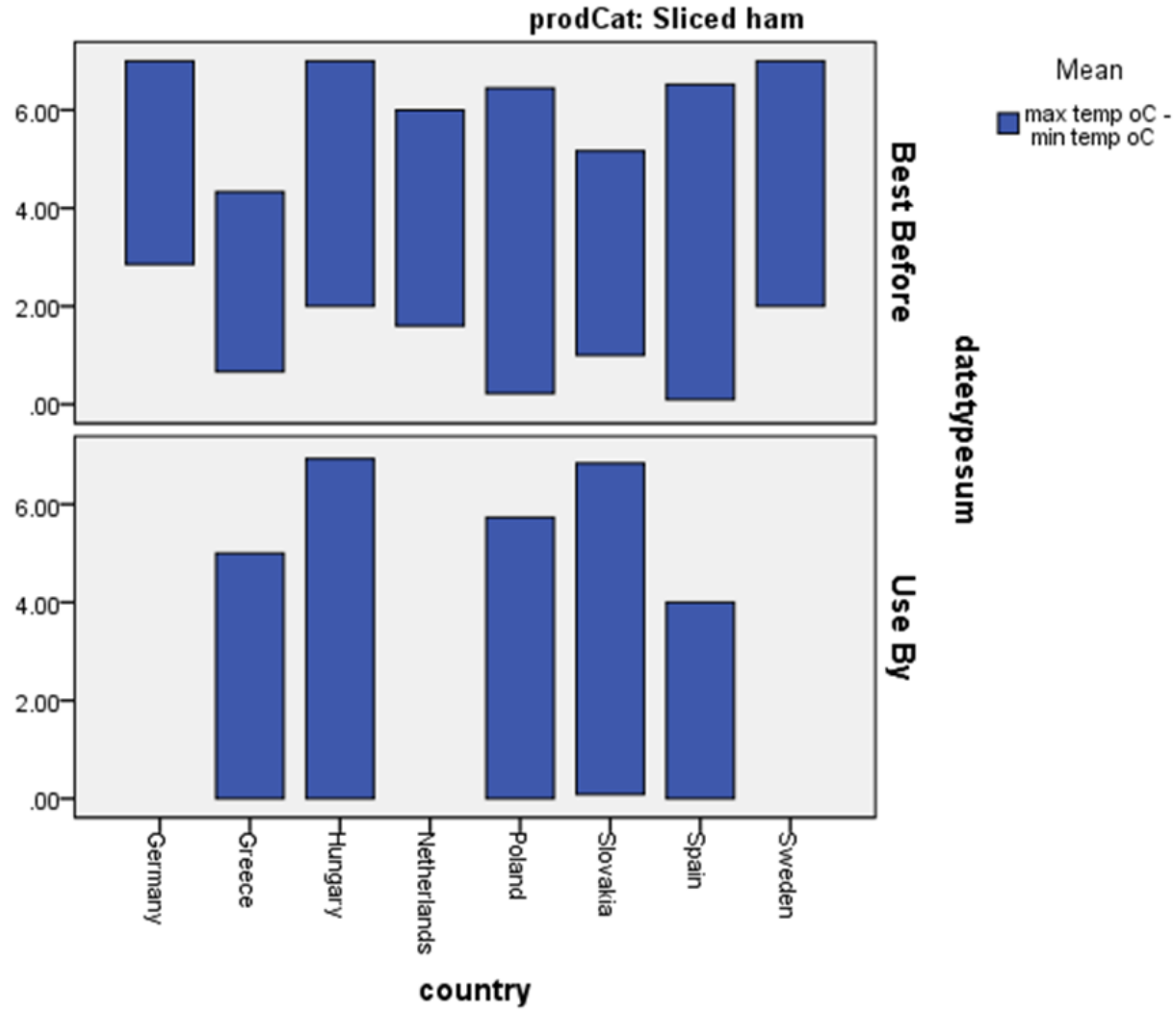
Sliced ham

Table A9.9 Sliced ham: storage advice/ temperature by Member State

Storage advice and temperature	DE	EL	HU	NL	PL	SK	ES	SE	Total
Temp range not directly linked to date mark (number and %)	2	7	10	5	25	18	44	1	112
	5.0%	38.9%	43.5%	29.4%	83.3%	81.8%	75.9%	3.3%	47.1%
Max storage temp as a condition related to date mark (number & %)	31	0	1	6	0	0	0	1	39
	77.5%	0.0%	4.3%	35.3%	0.0%	0.0%	0.0%	3.3%	16.4%
Single storage temperature, not linked to date mark (number & %)	0	3	1	1	0	0	0	0	5
	0.0%	16.7%	4.3%	5.9%	0.0%	0.0%	0.0%	0.0%	2.1%
Store refrigerated, no temperature advised (number & %)	0	1	1	0	0	0	4	18	24
	0.0%	5.6%	4.3%	0.0%	0.0%	0.0%	6.9%	60.0%	10.1%
Max temp not directly linked to date mark (number & %)	0	3	1	3	2	3	1	10	23
	0.0%	16.7%	4.3%	17.6%	6.7%	13.6%	1.7%	33.3%	9.7%
Temp range as condition directly linked to date mark (number and %)	5	0	3	0	0	0	0	0	8
	12.5%	0.0%	13.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.4%
No temp storage advice given (number and %)	2	4	0	2	1	0	2	0	11
	5.0%	22.2%	0.0%	11.8%	3.3%	0.0%	3.4%	0.0%	4.6%
Store at room temperature (number & %)	0	0	0	0	2	0	0	0	2
	0.0%	0.0%	0.0%	0.0%	6.7%	0.0%	0.0%	0.0%	0.8%
Protect from heat (number and %	0	0	6	0	0	0	0	0	6
	0.0%	0.0%	26.1%	0.0%	0.0%	0.0%	0.0%	0.0%	2.5%
Store in a cool place, no temperature advised (number and %)	0	0	0	0	0	1	7	0	8
	0.0%	0.0%	0.0%	0.0%	0.0%	4.5%	12.1%	0.0%	3.4%
Total (number and %)	**40**	**18**	**23**	**17**	**30**	**22**	**58**	**30**	**238**
	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: ICF

Figure A9.7 Storage temperature ranges for sliced ham by Member State



Source: ICF

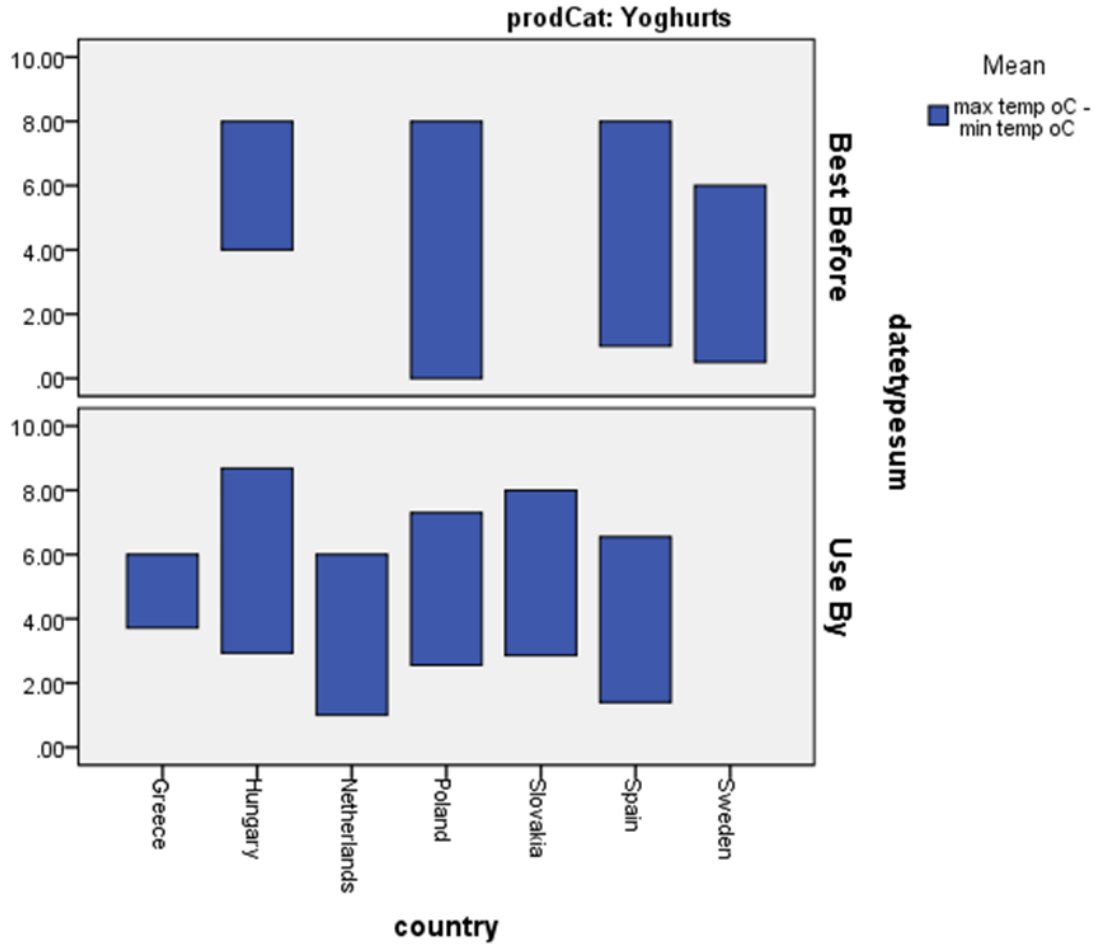
Yoghurts

Table A9.10 Yoghurts: storage advice/ temperature by Member State

Storage advice and temperature	DE	EL	HU	NL	PL	SK	ES	SE	Total
Temp range not directly linked to date mark (number and %)	0	7	22	2	44	35	23	1	134
	0.0%	41.2%	66.7%	18.2%	100.0%	92.1%	100.0%	5.6%	58.5%
Max storage temp as a condition related to date mark (number & %)	45	0	0	1	0	0	0	2	48
	100.0%	0.0%	0.0%	9.1%	0.0%	0.0%	0.0%	11.1%	21.0%
Store refrigerated, no temperature advised (number & %)	0	3	0	0	0	0	0	0	3
	0.0%	17.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%
Max temp not directly linked to date mark (number & %)	0	3	0	0	0	0	0	4	7
	0.0%	17.6%	0.0%	0.0%	0.0%	0.0%	0.0%	22.2%	3.1%
Temp range as condition directly linked to date mark (number and %)	0	0	0	0	0	0	0	1	1
	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.6%	0.4%
No temp storage advice given (number and %)	0	4	0	8	0	2	0	9	23
	0.0%	23.5%	0.0%	72.7%	0.0%	5.3%	0.0%	50.0%	10.0%
Protect from heat (number and %)	0	0	11	0	0	0	0	0	11
	0.0%	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%	4.8%
Total (number and %)	0	0	0	0	0	1	0	1	2
	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: ICF

Figure A9.8 Storage temperature ranges for yoghurts by Member State



Source: ICF

Annex 10 Topic Guide for National Competent Authorities

DG SANTE have asked ICF to investigate what influences the variation in practices across MS in relation to the use of date marking and other advice or information on food labels regarding product use/storage to assess the possible impact of these practices on food waste.

For example, some products are marked with a 'use by' date which indicates when food becomes unsafe, whereas some are marked with 'best before' date which indicates when food is no longer at its best quality. Some labels provide other information on how food should be stored or how long food lasts once it is opened or stored under certain temperature conditions. Labelling practices can be influenced by national and EU law and its interpretation, the practices of food businesses and local norms and consumer expectations. Among other factors – such as consumers' perceptions and knowledge of when certain kinds of food are unsafe to eat – these labels can also influence when food is thrown away, or whether it can be donated.

The Commission is looking at date marking and its possible impact on food waste prevention, and legislates to make labelling more consistent and easily understood. The removal of requirements for certain non-perishable foods to have a date mark is one of the options under consideration. (https://ec.europa.eu/food/safety/food_waste/eu_actions/date_marking_en)

We are interviewing food businesses (producers, manufacturers, retailers etc.), national policymakers (authorities such as food ministries and regulatory bodies), and other stakeholder groups (e.g. food banks, industry bodies). **This is the topic guide for the national authorities**.

For **national authorities**, we want to explore national practices and find out:

- Policymakers' views on the impact of date marking and food labelling more generally in relation to food waste prevention as well as rules and practices in place at national level;
- How EU and national legislation influence the way that dates are typically marked and storage information provided;
- Identify areas where inconsistency or lack of clarity in date marking and labelling could lead to a reduction in food waste;
- How food donation is handled for food after the "best before" date and any rules/practices in place at national level;
- Opportunities to reduce food waste generation related to date marking

For more information, see:

- Recent overview of national policies in the area of food waste prevention up to 2016 by FUSIONS : http://www.eu-fusions.org/index.php/country-reports/group-a AND http://www.eu-fusions.org/index.php/country-reports/group-b - **read the overview for the interviewee's country before beginning**
- The difference between 'use by' and 'best before': https://ec.europa.eu/food/sites/food/files/safety/docs/fw_eu_actions_date_marking_infographic_en.pdf
- Leaflet indicating meaning and translations of "use by" and "best before" in all EU MS https://ec.europa.eu/food/sites/food/files/safety/docs/fw_lib_best_before_en.pdf
- For more on the Commission's Circular Economy Action Plan, see http://ec.europa.eu/environment/circular-economy/index_en.htm

PLEASE ALSO REFER TO THE FINDINGS OF THE MYSTERY SHOPPING (TASK 2) SO INTERVIEWS CAN BE TAILORED TO THE ORGANISATION BEING INTERVIEWED AND SPECIFIC SECTORS DISCUSSED (E.G. FINDINGS AROUND MILK/YOGHURT LABELLING FOR THE DIARY AND RETAIL SECTORS) – THIS WOULD STIMULATE A MUCH RICHER DISCUSSION

Date marking is under the responsibility of food business operators who determine whether a product will require a "use by" or "best before" date as well as the length of shelf-life taking into account safety, quality and marketing considerations. Different types of dates ("best before" or "use by") can be used within the same food category, which from the user's perspective, can contribute to confusion regarding the meaning and use of date marking. Additional information conveyed to consumers in labelling such as "open life" guidance (e.g. "after opening consume within 3 days") can also contribute to food waste in the home if such advice is given (or is understood by consumers to be given) based on quality rather than safety considerations. In addition, different storage instructions can be provided for different items in the same category of foods.

Study Terms of Reference

National authorities will already have received a letter from us and DG SANTE asking them to provide us with a representative who is knowledgeable about national policy in this area.

Following this, ICF have:

- Identified (as far as possible) the right person to respond and provided background information on the project and the purpose of the interview
- Set up an interview date and time
- Asked whether they can do the interview in English or need a native speaker

Before the interview make sure that all interviewees are aware of the following so they can give informed consent:

- Introduce yourself and ICF, and confirm their name and role
- Check they understand the purpose of the study overall and the interview specifically, and that it will take about one hour (can be shorter if need be)
- Check whether they are content to respond in English or whether we need to reschedule with a native speaker
- Say the interviewee can end the interview at any time and there is no obligation to answer any question – they should feel free also to ask you to clarify, speak more slowly or repeat if they don't understand
- Ask permission to record the interview for accuracy and say that comments will not be attributed to individuals in our reporting
- Emphasise that no-one but the research team will have access to recordings or transcripts
- Check if they have any questions before beginning

Once the interview is completed, please fill in the tracker sheet to show it is complete and fill in the write up template.

The topic guide is semi-structured, providing general questions within the broad topics outlined above. As such, on every occasion it needs to

be tailored according to the particular stakeholder concerned and the time available to provide a 'conversation with a purpose'.

Understanding the context – collect information on rules, guidance and practice in relation to date marking

1) In [country] what is the role of date marking in provision of information to consumers and regulating the food supply chain and its safety?

- What are the main rules and standards governing date marking, and the advice and information on labels for storing food (including freezing) and when to throw it away?
- Specifically ask interviewees what is their understanding of the meaning of "best before" and "use by"
- Ask about the rules and practices related to date marking for different types of actors in the food supply chain (all food business operators including food banks/charities and consumers) This might include any standard procedures for determining date marks from lab tests, or best practice in this area
- Ask about different types of product groups (e.g. long-life products vs fresh produce)
- Rules/practices may include: the wording of date marking; specific rules on storage temperature or freezing; 'open life' advice; other storage or cooking advice; rules on promotions / restrictions and barriers associated with selling food close to (or past, in the case of 'best before' dates) the date on the label; rules and/or guidance related to food donation (e.g. VAT exemptions which may be linked to available shelf life/date marking, redistribution past the " best before" date etc..)
- What are the objectives of these rules/guidelines? (e.g. food safety, food quality, reducing waste)
- How have these rules, standards or norms developed? (e.g. in response to consumer demand, consulting with stakeholders, environmental / climate change / industrial policy drivers, EU law / acquis etc.)
- Which rules are obligatory and which are voluntary, and why?
- Discuss with reference to findings of the desk research if needed, e.g. our research showed that guidance on food storage in [country] often refers to temperature, etc.
- 2) How do these national requirements relate to EU rules?
- And what are the reasons for any differences or additional elements in national rules? (e.g. public health, food safety, etc.)
- As well as the rules on date marks in the Food Information for Consumers regulation, other EU legislation is also relevant e.g. marketing standards that require eggs to be labelled with a 'best before' date and fresh poultry with a 'use by'.

3) How are those rules implemented by operators in the market (explore different ones in turn: food producers, manufacturers, distributors and wholesalers, retailers, food banks/charities)

- What variation is there in terms of interpretation of national rules and standards?

- what are the factors that affect date marking approaches and food management (e.g. safety concerns, consumer information, ethical issues)
- How is the correct interpretation / compulsory elements of labelling enforced, monitored and checked? Who is responsible?
- How are incorrect interpretations / violations of law or rules typically dealt with?
- What guidance is provided to industry / operators in the market and by whom? What would you say is their awareness of requirements (such as, for example, those of the EU Food Information for Consumers regulations)?
- Ask specifically about cross-border issues (food companies or brands that sell the same product in multiple countries; food from other EU countries being sold in [country])

4) Who else, besides your organisation, is involved in setting standards and rules for date labelling and information?

- What role do they play in developing policy e.g. industry / stakeholder / consumer groups, large food companies, regional authorities…?

The impact of date marks and labels on consumers

5) What do you know about how consumers respond to different kinds of date marks and advice / information on storage including freezing?

- How do consumers understand terms such as 'use by' and 'best before' [use national equivalent terms, if necessary]
- How is this studied? What data are available?
- Are there any concerns? Problems identified? What are the most significant?
- Do consumers rely on date marks when deciding whether to throw food away? Does this result in consumers disposing of food that is still safe to eat?
- Find out what is known about consumers' response to these marks and propensity to throw food away – e.g. evidence that consumers tend to throw certain foods away if they pass a best before date, or whether additional information on storage or freezing discourages waste
- By whom / in what way are any concerns or problems raised (e.g. via consumer groups, etc.)
- Ask about different product groups
- have you undertaken action/programmes to help facilitate consumer understanding of date marking? What were the outcomes?

6) What do you know about how food business operators utilise different kinds of date marks and advice / information on storage including freezing?

- How do food business operators understand and utilise terms such as 'use by' and 'best before' [use national equivalent terms, if necessary]
- How is this studied? What data are available?
- Are there any concerns? Problems identified? What are the most significant?
- By whom / in what way are any concerns or problems raised (e.g. via trade associations)
- Ask about different product groups

7) If there was one action that [national authority / organisation] could do to improve consumer understanding of date marks, what would it be?

- ask about possible messaging to reinforce understanding of consumers: any successful approaches taken, balancing risks and benefits

Date marking and food waste

8) According to you, does date marking have an impact on generation of food waste? If so, how significant do you think date marking and other labelling issues are to food waste generation / reduction, and why? Is there a relationship between date marking and food waste in [country]?

- What misunderstandings may occur among different actors in the food supply chain in relation to different kinds of date marks?
- What types of labels are the most problematic?
- Again, explore by the different consumer and product groups – and pinpoint specific evidence / ways of quantifying the problem

9) Please tell us more about policy on date marking and its relation to reducing food waste, and the main policies and rules on this topic in [country] – both those in force and under consideration

- Is there a national food waste prevention programme in place; if so, are actions being undertaken in relation to date marking; type of action and timeline
- What are [country]'s plans for future policy in this area
- Relevant legislation, soft law / guidance / coordination, especially where it relates to date marking (including any standard operating procedures for determining date marks, length of shelf life, best practice and advice)
- Relationship between date marking and policies on encouraging (or restricting) food donation e.g. VAT rules that consider donated food to have zero value depending on a cut-off date specified in the marking; possibility to donate food after the "best before" date – all of which and more may encourage / facilitate food donation
- Funding 'smart packaging' research (e.g. in DE, NL) – e.g. edible films, packaging that helps preserve the food, warns customer if food is going off, etc.

10) What has been the impact of these approaches / policies related to date marking on reducing food waste?

- Ask why any particular approaches have been successful (or not)
- Can the impact be quantified?

Addressing confusion through EU-and national level action

11) Are there any barriers to implementing EU laws and requirements on date marking rules and labelling, as they currently are?

- Focus on NCAs' views on confusing and challenging aspects

e.g. terminology used (best before", "use by" and others); level of understanding of consumers and other actors in the food chain; possible improvement opportunities; any research carried out regarding consumer understanding, possible new terminology which may be better understood discussed/researched

If required, prompt with terminology considered by other countries/ organisations e.g. USA proposals: for quality, "best if used by" and for safety, "expires on…"; CODEX: e.g. for quality, "best quality before" date; for safety, "expiration date"…

- What would they suggest to foster more consistent date marking practices, as similar products are often given different date markings dependent on the food businesses that are defining them?

12) What, if anything, could be done at the EU level re date marking to help [country] overcome barriers to food waste prevention?

- Specifically focus on date marking rules and labelling
- Or other possible changes to existing date marking rules such as wording of labels
- Or other non-legislative action (e.g. guidance, communications campaigns.)
- If NCAs mention successful examples from third countries, it would be interesting to know about them for the purpose of this study.

13) What is your view on exemptions to the obligation to include a 'best before' date in food labelling?[8] Should there be additional exemptions under this obligation?

- Would such changes help prevent food waste?
- Would there be possible impact on consumer information / understanding / perception of risk or food safety among consumers and other actors such as food businesses?
- How any list of such foods should/could be derived (e.g. criteria to be utilized in selecting possible foods eligible for inclusion)

14) What, if anything, could be done at national level on date marking to facilitate more consistent use and prevent food waste? (legislative / non legislative action)

- -Who are the relevant players and what actions are needed?

Thanks and close

LIST OF FOODS EXEMPTED FROM DATE MARKING – Annex X of Regulation 1169/2011 on food information for consumers

fresh fruit and vegetables, including potatoes, which have not been peeled, cut or similarly treated; this derogation shall not apply to sprouting seeds and similar products such as legume sprouts,

—wines, liqueur wines, sparkling wines, aromatised wines, and similar products obtained from fruit other than grapes, and beverages falling within CN code 2206 00 obtained from grapes or grape musts,

—beverages containing 10 % or more by volume of alcohol,

—bakers' or pastry cooks' wares which, given the nature of their content, are normally consumed within 24 hours of their manufacture,

—vinegar,

—cooking salt,

[8] See http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32011R1169&from=en.

—solid sugar,

—confectionery products consisting almost solely of flavoured and/or coloured sugars,

—chewing gums and similar chewing products,

Annex 11 Topic Guide for European Organisations

DG SANTE have asked ICF to investigate what influences the variation in practices across MS in relation to the use of date marking and other advice or information on food labels regarding product use/storage to assess the possible impact of these practices on food waste.

For example, some products are marked with a 'use by' date which indicates when food becomes unsafe, whereas some are marked with 'best before' date which indicates when food is no longer at its best quality. Some labels provide other information on how food should be stored or how long food lasts once it is opened or stored under certain temperature conditions. Labelling practices can be influenced by national and EU law and its interpretation, the practices of food businesses and local norms and consumer expectations. Among other factors – such as consumers' perceptions and knowledge of when certain kinds of food are unsafe to eat – these labels can also influence when food is thrown away, or whether it can be donated.

The Commission is looking at date marking and its possible impact on food waste prevention, and legislates to make labelling more consistent and easily understood. The removal of requirements for certain non-perishable foods to have a date mark is one of the options under consideration. (https://ec.europa.eu/food/safety/food_waste/eu_actions/date_marking_en)

We are interviewing food businesses (producers, manufacturers, retailers etc.), national policymakers (authorities such as food ministries and regulatory bodies), as well as **European stakeholder and interest groups, to gather information.** Stakeholder organisations will vary in their role and remit: there will be consumer groups and industry groups too and each will need a carefully tailored approach in our questioning. Mainly, we want to gather information about:

- The factors that shape food businesses' approach to date marking and storage advice given on labels, including European and national legislation, industry guidance (for example from Trade Associations), local practices and commercial considerations;
- Any guidance provided by stakeholder organisations and what this consists of;
- Good practice or initiatives being undertaken to simplify, improve or make date marking and storage advice more consistent;
- Opportunities to reduce food waste generation related to date marking, as well as any good practice or initiatives in their sector

For more information, see:

- Recent overview of national policies in the area of food waste prevention up to 2016 by FUSIONS : http://www.eu-fusions.org/index.php/country-reports/group-a AND http://www.eu-fusions.org/index.php/country-reports/group-b
- The difference between 'use by' and 'best before': https://ec.europa.eu/food/sites/food/files/safety/docs/fw_eu_actions_date_marking_infographic_en.pdf
- Leaflet indicating meaning and translations of "use by" and "best before" in all EU MS https://ec.europa.eu/food/sites/food/files/safety/docs/fw_lib_best_before_en.pdf
- For more on the Commission's Circular Economy Action Plan, see http://ec.europa.eu/environment/circular-economy/index_en.htm

PLEASE ALSO REFER TO THE FINDINGS OF THE MYSTERY SHOPPING (TASK 2) SO

INTERVIEWS CAN BE TAILORED TO THE ORGANISATION BEING INTERVIEWED AND SPECIFIC SECTORS DISCUSSED (E.G. FINDINGS AROUND MILK/YOGHURT LABELLING FOR THE DIARY AND RETAIL SECTORS) – THIS WOULD STIMULATE A MUCH RICHER DISCUSSION

Date marking is under the responsibility of food business operators who determine whether a product will require a "use by" or "best before" date as well as the length of shelf-life taking into account safety, quality and marketing considerations. Different types of dates ("best before" or "use by") can be used within the same food category, which from the user's perspective, can contribute to confusion regarding the meaning and use of date marking. Additional information conveyed to consumers in labelling such as "open life" guidance (e.g. "after opening consume within 3 days") can also contribute to food waste in the home if such advice is given (or is understood by consumers to be given) based on quality rather than safety considerations. In addition, different storage instructions can be provided for different items in the same category of foods.

Study Terms of Reference

Stakeholder organisations will already have received a letter from us and DG SANTE asking them to provide us with a representative.

Following this, ICF have:

- Identified (as far as possible) the right person to respond and provided background information on the project and the purpose of the interview. Group interviews are also possible
- Set up an interview date and time
- Asked whether they can do the interview in English or need a native speaker

Before the interview make sure that all interviewees are aware of the following so they can give informed consent:

- Introduce yourself and ICF, and confirm their name and role
- Check they understand the purpose of the study overall and the interview specifically, and that it will take about one hour (can be shorter / longer if need be)
- Check whether they are content to respond in English or whether we need to reschedule with a native speaker
- Say the interviewee can end the interview at any time and there is no obligation to answer any question – they should feel free also to ask you to clarify, speak more slowly or repeat if they don't understand
- Ask permission to record the interview for accuracy and say that comments will not be attributed to individuals in our reporting
- Emphasise that no-one but the research team will have access to recordings or transcripts
- Check if they have any questions before beginning

Once the interview is completed, please fill in the tracker sheet to show it is complete and fill in the write up template.

The topic guide is semi-structured, providing general questions within the broad topics outlined above. As such, on every occasion it needs to

be tailored according to the particular stakeholder concerned and the time available to provide a 'conversation with a purpose'.

Filter the questions below to the organisation – distinguish between food trade bodies and for example consumer groups / food banks – some of these questions would not be relevant to the latter groups, although they will of course have opinions on food labelling and the potential impacts on their members / consumers

Understanding the context – collect information on rules, guidance and practice in relation to date marking

1) What kind of date marks and advice and information on labels are used by your sector (if relevant) and why?

- What do you understand by 'use by' and ''best before'?
- And how are those terms (or local equivalents) used in your sector?
- What do they mean and how are they used (e.g. alongside other date marks, storage advice including freezing etc.)?
- To what extent do these vary between members, countries, product groups, position in supply chain, etc.?
- Clearly differentiate between how 'use by' and 'best before' are used

2) Do you know how your members go about establishing date marking for their products? What are the factors taken into account and process for doing so? E.g. In terms of:

- How dates for individual products (or product categories) are set
- Choice to use BB or UB dates (especially given the inconsistent approaches we have found even for the same product across countries)
- Whether dates are supported by on-pack storage guidance or 'open life' guidance
- How dates are presented on consumer packaging (e.g. pack design & legibility, nature of advice on storage / freezing given, etc.)

3) Are you aware of any regulatory hurdles and/or commercial issues encountered by your members which are linked to date marking?

- e.g.: placing on the market of foods (including food donation) not allowed after the "best before" date; issues linked to commercial practices (e.g. stringent application by retailers of Minimum Life on Receipt (MLOR) standards – for example, we would want to know if date setting is influenced by commercial practices such as building in time buffers that impact on how much product life a customer is offered).

4) Can you tell me more about any guidance that your organisation provides – to industry or direct to consumers - concerning date marks and advice for consumers on packaging including how to store / freeze?

- Please describe purpose of each
- Results achieved
- How is the guidance developed (e.g. evidence used, who is involved), monitored and revised?

5) Can you tell me more about any instances where your organisation has encouraged your members to work together, or with others, to make improvements e.g.:

- Efforts to simplify date marking and information / advice on storage, freezing etc.
- Efforts to bring about a more consistent approach to date marking
- Efforts to understand what consumers want
- Efforts to facilitate inter-sectoral cooperation (e.g. agreements that industry provide food banks/charities with products with minimum 2 days available shelf-life; food manufacturer/retailer cooperation agreements in relation to MLOR etc...)
- What were the outcomes of such efforts?

The impact of date marks and labels on consumers

6) What do you know about how consumers respond to different kinds of date marks and advice / information on storage / freezing?

- How do consumers understand terms such as 'use by' and 'best before' [use national equivalent terms, if necessary] - Do consumers understand the difference between 'food quality' date marks and 'food safety' date marks?
- How is this studied? What data are available?
- Are you aware of any concerns about their understanding? Problems identified? What are the most significant?
- Do consumers rely on date marks when deciding whether to throw food away? Does this result in consumers disposing of food that is still safe to eat?
- Find out what is known about consumers' response to these marks and propensity to throw food away – e.g. evidence that consumers tend to throw certain foods away if they pass a best before date, or whether additional information on storage or freezing discourages waste
- By whom / in what way are any concerns or problems raised (e.g. via consumer groups, etc.)
- Ask about different product groups - do consumers perceive risk differently, and respond in different ways to the same information - depending on the type of food in question

7) If there was one action that your organisation could do to improve consumer understanding of date marks, what would it be?

- ask for views on confusing and challenging aspects

e.g. terminology used (best before", "use by" and others); level of understanding of consumers and other actors in the food chain; possible improvement opportunities; any research carried out regarding consumer understanding, possible new terminology which may be better understood discussed/researched

If required, prompt with terminology considered by other countries/ organisations e.g. USA proposals: for quality, "best if used by" and for safety, "expires on…"; CODEX: e.g. for quality, "best quality before" date; for safety, "expiration date"…

- What would they suggest to foster more easily understood date marking practices e.g. possible messaging to reinforce understanding of consumers: any successful approaches taken, balancing risks and benefits

- How might confusion if it exists be addressed in future?

Date marking and food waste

8) According to you, does date marking have an impact on generation of food waste? If so, how significant do you think date marking and other labelling issues e.g. storage are to food waste generation / reduction, and why?

- To what extent is this issue recognised among your members?
- Has your organisation undertaken any work in this area? If so, what were the results and how did they come about?
- Respondent's beliefs / evidence around whether products are less likely to be wasted if they carry a BB date rather than a UB date – with reference to sector findings / differing practices between countries if helpful
- Respondent's beliefs / evidence as to the impact of better storage advice on food waste e.g. if consumers are told how to store food well, does it make a difference to product life and to waste?

9) And are you aware of any national policies, industry initiatives etc. that attempt to tackle the amount of food waste, in relation to changing date marking and its wording / the advice it comes with e.g. on storage?

- Changes in legislation, soft law / guidance / coordination, especially where it relates to date marking (including any standard operating procedures for determining date marks, length of shelf life, best practice and advice)
- Changes to policy for encouraging food donation e.g. VAT rules that consider donated food to have zero value depending on a cut-off date specified in the marking, or changing rules which prohibit placing on the market past the "best before" date.
- Have any particular approaches been successful (or not) and why?
- Lastly have there been any initiatives that [company] has taken to alter date marks and advice given in order to reduce food waste e.g. smart packaging: edible films, packaging that helps preserve the food, warns customer if food is going off, etc. Also, industry's consideration of the type of date to use (e.g. "best before" in lieu of "use by", where safe to do so, in order to prevent food waste and facilitate food donation – is there more potential to do so?. Were these initiatives successful (or not) and why?

Addressing confusion through EU-and national level action

10) What, if anything, could be done at the EU level re date marking and related information on labels to help your organisation and its members overcome barriers to food waste prevention?

- Specifically focus on date marking rules and labelling
- Or other possible changes to existing date marking rules such as wording of labels
- Or other non-legislative action that the EU could direct national authorities to take (e.g. guidance, communications campaigns...)

11) What, if anything, could be done at national level on date marking to facilitate more consistent use and prevent food waste? (legislative / non legislative action)

- Who are the relevant players and what actions are needed?

12) What is your view on exemptions to the obligation to include a 'best before' date in food labelling?[9] Should there be additional exemptions under this obligation?

- Would such changes help prevent food waste?
- Would there be possible impact on consumer information / understanding / perception of risk or food safety among consumers and other actors such as food businesses?
- How any list of such foods should/could be derived (e.g. criteria to be utilized in selecting possible foods eligible for inclusion)

Thanks and close

LIST OF FOODS EXEMPTED FROM DATE MARKING – Annex X of Regulation 1169/2011 on food information for consumers

fresh fruit and vegetables, including potatoes, which have not been peeled, cut or similarly treated; this derogation shall not apply to sprouting seeds and similar products such as legume sprouts,

—wines, liqueur wines, sparkling wines, aromatised wines, and similar products obtained from fruit other than grapes, and beverages falling within CN code 2206 00 obtained from grapes or grape musts,

—beverages containing 10 % or more by volume of alcohol,

—bakers' or pastry cooks' wares which, given the nature of their content, are normally consumed within 24 hours of their manufacture,

—vinegar,

—cooking salt,

—solid sugar,

—confectionery products consisting almost solely of flavoured and/or coloured sugars,

—chewing gums and similar chewing products,

[9] See http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32011R1169&from=en.

Annex 12 Topic Guide for Food Business Operators

DG SANTE have asked ICF to investigate what influences the variation in practices across MS in relation to the use of date marking and other advice or information on food labels regarding product use/storage to assess the possible impact of these practices on food waste.

For example, some products are marked with a 'use by' date which indicates when food becomes unsafe, whereas some are marked with 'best before' date which indicates when food is no longer at its best quality. Some labels provide other information on how food should be stored or how long food lasts once it is opened or stored under certain temperature conditions. Labelling practices can be influenced by national and EU law and its interpretation, the practices of food businesses and local norms and consumer expectations. Among other factors – such as consumers' perceptions and knowledge of when certain kinds of food are unsafe to eat – these labels can also influence when food is thrown away, or whether it can be donated.

The Commission is looking at date marking and its possible impact on food waste prevention, and legislates to make labelling more consistent and easily understood. The removal of requirements for certain non-perishable foods to have a date mark is one of the options under consideration. (https://ec.europa.eu/food/safety/food_waste/eu_actions/date_marking_en)

We are interviewing food businesses (producers, manufacturers, retailers etc.), national policymakers (authorities such as food ministries and regulatory bodies), and other stakeholder groups (e.g. food banks, industry bodies). **This is the topic guide for the food businesses**. Note that food businesses may operate across national borders, and occupy different places in the supply chain. For **food businesses**, we want to explore national (and international) practices and find out:

- The factors that shape food businesses' approach to date marking and storage advice given on labels, including European and national legislation, local practices and commercial considerations;
- How their approach to date marking varies according to place and product groups;
- Food businesses' views on the impact of date marking and food labelling in relation to food waste prevention;
- Identify areas where inconsistency or lack of clarity in date marking and labelling could lead to a reduction in food waste;
- Whether and how food businesses donate food, and links with date marking practices;
- Opportunities to reduce food waste generation related to date marking.

For more information, see:

- Recent overview of national policies in the area of food waste prevention up to 2016 by FUSIONS : http://www.eu-fusions.org/index.php/country-reports/group-a AND http://www.eu-fusions.org/index.php/country-reports/group-b - **read the overview for the interviewee's country before beginning**
- The difference between 'use by' and 'best before': https://ec.europa.eu/food/sites/food/files/safety/docs/fw_eu_actions_date_marking_infographic_en.pdf
- Leaflet indicating meaning and translations of "use by" and "best before" in all EU MS

https://ec.europa.eu/food/sites/food/files/safety/docs/fw_lib_best_before_en.pdf

- For more on the Commission's Circular Economy Action Plan, see http://ec.europa.eu/environment/circular-economy/index_en.htm

PLEASE ALSO REFER TO THE FINDINGS OF THE MYSTERY SHOPPING (TASK 2) SO INTERVIEWS CAN BE TAILORED TO THE ORGANISATION BEING INTERVIEWED AND SPECIFIC SECTORS DISCUSSED (E.G. FINDINGS AROUND MILK/YOGHURT LABELLING FOR THE DIARY AND RETAIL SECTORS) – THIS WOULD STIMULATE A MUCH RICHER DISCUSSION

Date marking is under the responsibility of food business operators who determine whether a product will require a "use by" or "best before" date as well as the length of shelf-life taking into account safety, quality and marketing considerations. Different types of dates ("best before" or "use by") can be used within the same food category, which from the user's perspective, can contribute to confusion regarding the meaning and use of date marking. Additional information conveyed to consumers in labelling such as "open life" guidance (e.g. "after opening consume within 3 days") can also contribute to food waste in the home if such advice is given (or is understood by consumers to be given) based on quality rather than safety considerations. In addition, different storage instructions can be provided for different items in the same category of foods.

Study Terms of Reference

Food business operators will already have received a letter from us and DG SANTE asking them to provide us with a representative who is knowledgeable about practice in this area and who is responsible for taking decisions about date marking on behalf of a business, business unit or a brand owned by the business.

Following this, ICF have:

- Identified (as far as possible) the right person to respond and provided background information on the project and the purpose of the interview. Researchers will also be provided with some background information on the company and what it does. If multiple people are involved in making decisions on date marking (e.g., one person responsible for compliance or regulatory affairs; another responsible for brand management) a group interview or separate interviews may be appropriate.
- Set up an interview date and time
- Asked whether they can do the interview in English or need a native speaker

Before the interview make sure that all interviewees are aware of the following so they can give informed consent:

- Introduce yourself and ICF, and confirm their name and role
- Check they understand the purpose of the study overall and the interview specifically, and that it will take about one hour (can be shorter if need be)
- Check whether they are content to respond in English or whether we need to reschedule with a native speaker
- Say the interviewee can end the interview at any time and there is no obligation to answer any question – they should feel free also to ask you to clarify, speak more slowly or repeat if they don't understand
- Ask permission to record the interview for accuracy and say that comments will not be attributed to individuals in our reporting

- Emphasise that no-one but the research team will have access to recordings or transcripts
- Check if they have any questions before beginning

Once the interview is completed, please fill in the tracker sheet to show it is complete and fill in the write up template.

The topic guide is semi-structured, providing general questions within the broad topics outlined above. As such, on every occasion it needs to be tailored according to the particular stakeholder concerned and the time available to provide a 'conversation with a purpose'.

Understanding the context – collect information on rules, guidance and practice in relation to date marking

1) How are decisions about date marking, and advice and information given on labels, taken in [company]?

- Who is responsible (e.g. safety labs, QA, regulatory compliance function, consumer insight function, marketing function - will depend on the nature of the business) or an external company e.g. a supplier) for making these decisions?
- If your company is not ultimately responsible for deciding the date on the packaging - who is and why?
- How are external actors involved (e.g., other FBOs in the supply chain, national competent authorities, trade associations and other organisations, consumers) – how do they work together with your company?
- Does the decision making process vary according to different brand groups, foods etc. within the same business? How?
- Is there a standard procedure for determining a date, storage conditions, etc.?
- Do you try to ensure consistency in date marking across [company, brand or food group] for any reason? Why?

2) What kind of date marks and other information provided on food labels are used by [company]? How are the date mark and any such other information (including advice or instructions on storage / freezing) presented to your customers (refer to countries and the practices about which we know already, if needed), and why?

- What do you understand by 'use by' and 'best before'?
- How are these dates set for individual products (or product categories)?
- (We also want to know if date setting is influenced by commercial practices such as building in time buffers that impact on how much product life a customer is offered). – so we know more about the differences between the maximum life vs the shelf-life given on the pack at manufacture (the actual life))
- Does your company utilise open life instructions and storage / freezing advice? What is the basis for them?
- How are date marks and other advice presented? How are 'use by' and 'best before' terms (or local equivalents) chosen for use on different products, and how is any additional advice presented?

- How does [company] ensure legibility of date marks and other information? How prominent are the date marks relative to other advice?
- Explore different approaches taken by [company], asking in relation to each of the following questions, about the importance of total or actual life, available life, open life, and maximum life; processing and packaging techniques; storage temperature; distribution channels; customer insights; feedback/needs of food banks/charities
- Do the date marks and advice given by [company] vary according to different national or local markets, or the intended customer whether this is the consumer or another business in the supply chain? How?
- (If operating in more than one country) Are there cross-border considerations on presenting this information (e.g. requirement to print packaging in multiple languages, use of over-labels etc.)?
- Are practices changing innovatively over time – for example, through introduction of smart packaging?
- Discuss with reference to the findings of the mystery shopping e.g. types of advice given in different countries, level of detail, prominence given to the information, etc.

3) Can you tell me more about the factors that [company / whoever provides the date mark or advice] takes into consideration when choosing a certain type of date mark ('use by', 'best before' or other) or a format for giving advice and information on storage? Prompt for:

- European (Food Information for Consumers Regulation) or national requirements in law
- Safety and quality evidence from a lab or tests - and how is this used?
- Consumer research or insight, feedback/customer complaints or in response to demand for more information - and how is this used?
- Marketing / appearance considerations - Give examples: e.g. premium products may be marked with a shorter life than non-premium counterparts, or products close to the end of their shelf life may be the subject of sales promotions.
- Guidance from national competent authorities or trade associations, or another source - describe what this guidance consists of
- Practices arising from collaboration between businesses in the supply chain - please describe
- Which of these factors are the most important?
- And if there is guidance, established practice or fixed rules - are there a number of ways in which [company] can choose to respond / comply, when choosing a date and a type of date mark on its products (are these practices subject to internal review?)

Consumers' perceptions and understandings (will apply to food manufacturers / processors, retailers and shoppers, but also prompt for B2B consumers in the supply chain if relevant)

4) What do you know about how consumers respond to different kinds of date marks and advice / information on storage / freezing?

- How do consumers understand terms such as 'use by' and 'best before' [use national equivalent terms, if necessary]

- How is this studied? What data are available?
- Are you aware of any concerns about their understanding? Problems identified? What are the most significant?
- Do consumers rely on date marks when deciding whether to throw food away? Does this result in consumers disposing of food that is still safe to eat?
- Find out what is known about consumers' response to these marks and propensity to throw food away – e.g. evidence that consumers tend to throw certain foods away if they pass a best before date, or whether additional information on storage or freezing discourages waste
- By whom / in what way are any concerns or problems raised? (e.g. via consumer groups, etc.)
- Ask about different product groups - do consumers perceive risk differently, and respond in different ways to the same information - depending on the type of food in question
- Have you undertaken action/programmes to help facilitate consumer understanding of date marking? What were the outcomes?

5) If there was one action that [company] could do to improve consumer understanding of date marks, what would it be?

- ask for views on confusing and challenging aspects

e.g. terminology used (best before", "use by" and others); level of understanding of consumers and other actors in the food chain; possible improvement opportunities; any research carried out regarding consumer understanding, possible new terminology which may be better understood discussed/researched

If required, prompt with terminology considered by other countries/organisations e.g. USA proposals: for quality, "best if used by" and for safety, "expires on…"; CODEX: e.g. for quality, "best quality before" date; for safety, "expiration date"…

- What would they suggest to foster more easily understood date marking practices e.g. possible messaging to reinforce understanding of consumers: any successful approaches taken, balancing risks and benefits; more consistent date marking practices amongst FBOs?
- How might confusion if it exists be addressed in future?
- Potential role of supplementary advice e.g. storage temperature / conditions, keeping products in packaging and freezing

Date marking and food waste

6) [For retailers] Can you tell me more about what happens to food that you have been unable to sell and is past its "best before" or "use by" date? Please ask specifically about what happens after each date has passed so we can learn about any different practices based on type of date

- Is it marked down in price or donated ("best before" only)? Is it changed into animal feed, or composted for example or disposed of as waste?
- Is that the same in all the EU markets you operate in (MS or local markets)? If not, why is it different in some markets?
- Discuss the various incentives or disincentives to preventing food waste through donation and other measures e.g. inventory / storage space, legal barriers, inability to treat food as a donation because of VAT rules, inability to market

foods past the "best before" date, lack of infrastructure (e.g. redistribution charities), cost / profitability barriers etc.

- Do these barriers vary across countries? If so, how?

7) Do you think practices in date marking have an impact on generation of food waste? If so, how significant do you think date marking and other labelling issues are to food waste generation / reduction, and why? Is there a relationship between date marking and food waste in [company's] markets?

- Where specifically is this an issue in the production/supply chain, in retail or in post-consumer food waste? Is this an issue your company has considered or quantified? [probe – if quantified, ask if they will tell you how]
- What are the main barriers to more prevention of food waste e.g. VAT rules
- For which products especially do you think date mark labels (and any related guidance) have an impact on food waste generation? How do date marks contribute to food waste for these products?
- (e.g. company operational reasons, supply-chain reasons, inconsistent use of date labels across products & markets, consumer confusion etc.)
- What evidence is there?
- Are there specific issues to do with how date marks and related guidance are presented to consumers on packaging?
- What opportunities do you think there are to reduce the impact of date marking in food waste generation?

8) And are you aware of any national policies, industry initiatives etc. that attempt to tackle the amount of food waste, in relation to changing date marking and its wording / the advice it comes with?

- Changes in legislation, soft law / guidance / coordination, especially where it relates to date marking (including any standard operating procedures for determining date marks, length of shelf life, best practice and advice)
- Changes in date marking so it is encouraging food donation e.g. VAT rules that consider donated food to have zero value depending on a cut-off date specified in the marking; lifting restrictions on placing on the market or donating food past the "best before" date – all of which and more may encourage / facilitate food donation and reduce waste
- Have any particular approaches been successful (or not) and why?
- Lastly have there been any initiatives that [company] has taken to alter date marks and advice given in order to reduce food waste e.g. smart packaging: edible films, packaging that helps preserve the food, warns customer if food is going off, etc. Were they successful (or not) and why?

Addressing confusion through EU-and national level action

9) What, if anything, could be done at the EU level re date marking to help [company] and other similar organisations overcome barriers to food waste prevention?

- Specifically focus on date marking rules and labelling
- Or other possible changes to existing date marking rules such as wording of labels

- Or other non-legislative action that the EU could direct national authorities to take (e.g. guidance, communications campaigns.)
- other action taken by FBOs themselves
- Is there a role for European-level sector / industry bodies?

10) What is your view on exemptions to the obligation to include a 'best before' date in food labelling?[10] Should there be additional exemptions under this obligation?

- Would such changes help prevent food waste?
- Would there be possible impact on consumer information / understanding / perception of risk or food safety among consumers and other actors such as food businesses?
- How any list of such foods should/could be derived (e.g. criteria to be utilized in selecting possible foods eligible for inclusion)

11) What, if anything, could be done at national level on date marking to facilitate more consistent use and prevent food waste? (legislative / non legislative action)

- Who are the relevant players and what actions are needed?

Thanks and close

LIST OF FOODS EXEMPTED FROM DATE MARKING – Annex X of Regulation 1169/2011 on food information for consumers

fresh fruit and vegetables, including potatoes, which have not been peeled, cut or similarly treated; this derogation shall not apply to sprouting seeds and similar products such as legume sprouts,

—wines, liqueur wines, sparkling wines, aromatised wines, and similar products obtained from fruit other than grapes, and beverages falling within CN code 2206 00 obtained from grapes or grape musts,

—beverages containing 10 % or more by volume of alcohol,

—bakers' or pastry cooks' wares which, given the nature of their content, are normally consumed within 24 hours of their manufacture,

—vinegar,

—cooking salt,

—solid sugar,

—confectionery products consisting almost solely of flavoured and/or coloured sugars,

—chewing gums and similar chewing products,

[10] See http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32011R1169&from=en.

Annex 13 Task Specifications

The following text is a description of the study tasks, as set out by the Commission.

Task 1: Desk research - Compile existing food waste data for all the 28 EU Member States in order to assess main food categories contributing to food waste

The contractor shall conduct desk research to collect and compile existing food waste data, where available, for all the EU MS in order to identify the main foods contributing to food waste generation in households as well as retail and food service sectors. Information collected and analysed will help inform the selection of foods for market research on date marking practices as well as research carried out amongst food business operators and national competent authorities (parts 2 and 3 of the study). The desk research should be conducted for each of the 28 EU Member States in order to identify the main foods contributing to food waste (expressed by weight and value).

This task should deliver:

a) Data for each of the 28 MS (where available), including:

- A list of the main foods contributing to food waste in households as well as retail and food service sectors;
- Reporting of food waste levels by weight and value (per sector where available);
- Sources of the data (list of studies and data utilised).

b) Data analysis and an EU common list of main foods contributing to food waste which bear date marking

The concept of what constitutes food waste in the 3 abovementioned stages of the food supply chain should wherever possible reflect that presented in the manual developed by the EU-funded research project FUSIONS to quantify food waste levels[11]. Where different definitions or concepts are used in national studies, these should be documented. Where data for food waste from households are not available, data on food waste from municipal waste can be used instead. The contractor should indicate where data are lacking (e.g. for specific sectors or MS) and how these gaps have been taken into account in their final analysis and reporting of the main foods contributing to food waste in the EU. The information that will be gathered by the contractor will help inform, along with other parameters, the selection of foods for market research on date marking practices.

Task 2: Market research - Mapping of commercial practices by analysing the use of date marking and other information found on labelling information regarding product use/storage in selected food categories

The overall deliverable of Task 2 is the mapping (quantitative and qualitative) of date marking practices for selected food categories.

Requirements or services

1. The Contractor shall establish a general work plan, propose a research methodology and explain the rationale behind the chosen methodology, including sampling method and weighting factors for agreement with the Commission. The

[11] http://eu-fusions.org/phocadownload/Publications/FUSIONS%20Food%20Waste%20Quantification%20Manual.pdf

market survey will involve field research carried out amongst a sample of retailers and store formats, representative of the retail environment in each country. Data should be captured separately for stores in at least 5 Member States with the selection of countries aiming to represent the diversity of the situation in the EU based on criteria such as: demographics, geographical coverage, size of country as well as national rules and practice in relation to date marking. Indicatively, the consultant may consider including the following MS: DE, EL, PL, PT and SK. The list of Member States, if different from those indicatively mentioned above, will be proposed by the consultant with the relevant justifications on the basis of the above mentioned criteria for discussion and validation by the Commission.

2. The Contractor shall organise a meeting with the Commission to define the specific food categories and other elements concerning the collection of data. Food categories should be chosen on the basis of several criteria that will be agreed between the Commission and the contractor to reflect those foods which bear a date marking (mainly "best before" date) and which may contribute to food waste. The information gathered in Task 1 would be used in that respect. Indicatively, the following factors or criteria will be taken into account in selecting the food categories for phase 2:

    - possible contribution to food waste (taking into account results of task 1)
    - presence of date marking (i.e. packaged foods)
    - utilisation of both “use by” and “best before” dates in the same food category
    - use of "open life" instructions (in some but not necessarily all foods selected)
    - information on storage/use/freezing/defrosting instructions (depending on the category)
    - variety/breadth of storage/use/freezing/defrosting instructions
    - variety/breadth of ingredients (meat, fish, vegetable) and type of processing (raw and heat treated)
    - variety/breadth of packaging solutions and features

    The Contractor should propose at least 10 food categories for this work, explaining for each category, why it was chosen.

3. The Contractor shall develop a structured data capture system (database) that will incorporate the collected data, including product images (i.e. labels). The database should be searchable by the Commission and other actors in order to compile reports for specific foods or Member States, for example. The data should be recorded in the official language of the selected MS and in English, where labelled as such. Where needed to support the analysis of findings, certain wording used in labelling may need to be translated into English.
4. The Contractor shall undertake data collection across a representative sample for each of the selected Member States as a whole of retailers and store formats. The work will determine what is currently available to consumers in the way of, for example:

    - date marking;
    - open life instructions;
    - on-pack and in-store storage, usage, cooking and portioning guidance;
    - packaging functionality.

An indicative list of the key data and other contextual information to be collected by the contractor is given in point 7 below.

5. For each food category, the full range of branded and private label foods available in store (including all variants, see point 6 below) should be evaluated.
6. The Contractor shall analyse the data and map, for each food category, where there are differences or similarities in relation to date marking practice. For each food category, the contractor should identify and quantify the use of "use by" and "best before" labelling for each variant (for instance for yogurt: plain, by flavour, low/high fat, bifidus, …). The contractor shall deliver a report which will summarise findings and include evidence-based recommendations for each of the food categories and the work undertaken under this specific task. The data collected through this research should also constitute an important source for the selection of food business operators that will be interviewed under Task 3 in order to identify the underlying factors affecting date marking practices, length of shelf-life and other information provided on the labels between food items which, from a consumer perspective, look quite similar.
7. The project involves collecting a range of data on key food items thought to be representative of their food category.

   Indicatively, the key data that should be collected for analysis shall be as follows:

   - date marks displayed on the packaging (both type of date marking, and wording used);
   - length of available shelf-life (vs date of purchase i.e. at time of survey);
   - "open life" instructions (both presence of, and wording used);
   - storage instructions (both presence of, and wording used);
   - freezing and defrosting instructions, where applicable (both presence of, and wording used);
   - the presence of cooking instructions, recipes and tips;
   - packaging and pack features related to storage and conservation (e.g. re-closable packs);
   - any point of sale information related to use of foods within a certain date (e.g. possible presence of "sell by" dates, discounts for foods close to the "use by" or "best before" date).

   The data collection process shall include a representative number of stores covering the whole geographical area across the selected MS. In addition, in order to be able to fully analyse these data, indicatively, the following information (where relevant) shall be recorded:

   - retailer name/brand
   - store type/size
   - store location (geographical)
   - whether the food is branded or private label;
   - legal/customary/descriptive name of the food;
   - where appropriate processing (e.g. pasteurisation) and packaging technique (e.g. packaging gases);

- variant (e.g. standard tomato/original or tomato and herb pasta sauce);
- in-store location (i.e. whether chilled, ambient, frozen or from the deli counter)

Task 3: Stakeholders in-depth interviews

The Contractor shall carry out a minimum of 60 in-depth interviews with:

- a selection of national competent authorities aiming to represent the diversity of the situation in the EU based on criteria such as: demographics, geographical coverage, size of country as well as national rules and practice in relation to date marking. Indicatively the consultant may consider the following MS, taking into account countries included in part 2 as well as MS with active food waste prevention programmes, e.g. DE, EL, NL, PL, PT, SK and UK. The list of Member States, if different from those indicatively mentioned above, will be proposed by the consultant with the relevant justifications on the basis of the above mentioned criteria for discussion and validation by the Commission.
- European organisations representing food manufacturing, retail, food service sectors, consumer organisations and food banks;
- food business operators (minimum of 25 food manufacturers, wholesalers, mass caterers and retailers, including SMEs to ensure that views are sought from large, medium and small enterprises). Information gathered in stage 2 of the study, in particular, will help to identify the food business operators which will be selected for in depth interviews and also inform the questions to be addressed to interviewees.

One-on-one interviews should be carried out (face-to-face, phone, Skype, etc.) according to an interview guide to be agreed with the European Commission. Interviews will seek to investigate how food business operators and national competent authorities understand and implement date marking in their respective areas of work, and the possible impact of such practice on food waste and food waste prevention. The purpose is to determine if there are differences as to how food business operators and Member States regard the application of the legislation and the determining factors for date marking, as well as any differences existing within each group. The aim is also to investigate if differences in the use of date marking by food business operators are based on different food characteristics and storage conditions or if they are due to different commercial practices or regulatory interpretations. Interviews will also help inform the options currently being considered by the Commission and Member States in order to simplify date labelling, that is the possible extension of the list of foods which are exempt from the obligation to include a "best before" date.

The consultant may also propose to complement the interviews with online research in order to reach a broader target audience. The Commission would consider any such proposal in the context of the overall project plan and budget outlined in the offer.

Areas of investigation for these three groups of actors include:

a) food business operators: how date marking is implemented in their business (e.g. with respect notably to: marketing strategy; inventory, shelf turnover and supply chain management; requirements from customers or to suppliers; etc.); parameters taken into account by manufacturers in setting dates (e.g. choice of "use by" vs "best before"; length of shelf-life; how practices may vary depending on type of product, processing and packaging technique, storage temperature, consumer insights, distribution channels, etc.); commercial practice linked to date marking (e.g. discounts for foods close to end of shelf life, food donation, etc.); possible extension of the list

of foods which are exempt from the obligation to include a "best before" date.

b) European organisations representing food business operators, including food banks, and consumers: how date marking is utilised in industry and to manage supply chain including redistribution; relevant guidelines; best practice; consumer needs and expectations; etc.

c) national competent authorities: understanding and use of date marking in regulating marketing and distribution of foods (including food donation); any existing regulations, administrative guidelines related to date marking; how foods past the "best before" date are regulated; etc.

The Contractor shall report on findings of all stakeholder interviews and analyse them, taking into account findings from the market study (part 2).

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