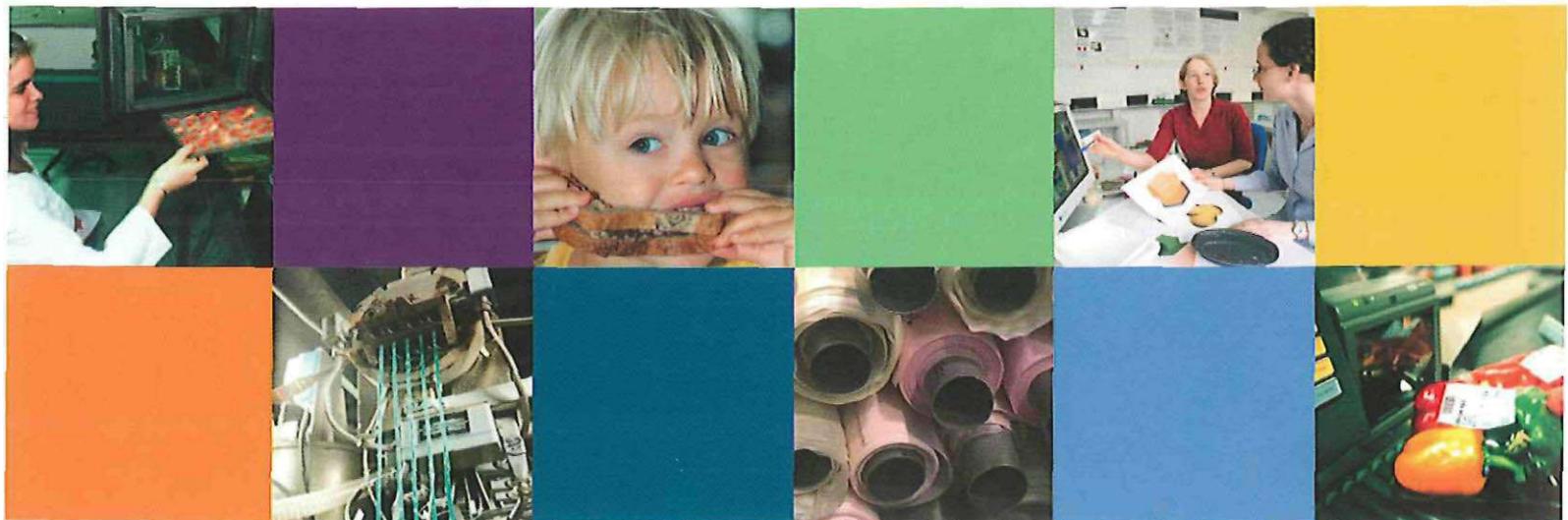




Expiry Dates: a Waste of Time?

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Contents

1 Introduction and Aim	4
2 Approach	6
3 Legislation and Guidelines on Expiry Dates	7
3.1 Minimum durability and use-by dates: flexible or rigid? Memorandum on liability for the expiry of the date of minimum durability	7
3.2 Note on the text of the legislation	14
3.3 Guidelines and supplements in the Netherlands and the EU on expiry dates	15
3.4 Current communication on expiry dates from other than supply chain parties	17
4 Expiry Dates in Practice	20
4.1 Creating product date information	20
4.1.1 Choosing the date information type	20
4.1.2 The actual date on the product	21
4.1.3 Creating product date information in practice	22
4.2 How product date information is dealt with	25
5 The Relationship between Expiry Dates and Food Waste	30
5.1 Existing research on how expiry dates are dealt with	30
5.2 How much do minimum durability dates contribute to food wastage in the Netherlands?	31
6 Good Practice	34
7 Using Technical Indicators for Actual Durability	37
8 Conclusions	38
9 Discussion	39
10 Recommendations	40
References	41
Appendix 1 Products that do not Require a Minimum Durability or Use-by Date	44
Appendix 2 Additional Legislation and Instructions on Expiry Dates	45
Appendix 3 Communication on Expiry Dates	46
Appendix 4 Legal Definitions	57

1 Introduction and Aim

Reducing food wastage¹ is one way of making food chains more sustainable, and it can cut costs to companies and consumers. The Ministry of Economic Affairs, Agriculture and Innovation has therefore set the target of a 20% reduction in food wastage throughout the chain by 2015 (Sustainable Food policy document, 2009). This aspiration was set out in the Sustainable Food policy document (2009) and confirmed in a letter of 10 December 2010 to the House of Representatives.

Various government bodies, ranging from the Dutch House of Representatives to other European governments and the European Parliament, have identified better use of expiry dates as one way of combating food wastage. Various proposals have been put forward in this connection:

- Abolishing minimum durability dates for long-life products;
- Providing better information to consumers on the difference between minimum durability and use-by dates;
- Placing both 'sell by' and 'use by' dates on packaging.

The UK government has already decided to cut down the four dates ('use by', 'sell by', 'best before' and 'display until') that can be shown on packaging to two, so as to reduce confusion among consumers regarding expiry dates.

As it is not clear what the options are when it comes to dealing with and making changes in expiry dates, the Ministry of Economic Affairs, Agriculture and Innovation commissioned Wageningen University and Research Centre to try to clarify various aspects of the use of expiry dates (BO-08-008.02-012 Food Wastage).

Aim and research questions

The aim of this study is twofold:

1. To investigate what is possible under the current legislation on expiry dates so as to reduce food wastage;
2. To indicate how expiry dates are being used in practice and investigate whether the consequences as regards food wastage are known or can be ascertained.

The following research questions were therefore formulated:

Legislation

1. What is legally possible as regards changing the current legislation on the compulsory labelling of minimum durability dates on food products (abolition, replacement with production date, or adoption of the UK equivalent, 'best before')?
2. Is there any case law showing that product liability regarding the use of minimum

¹ The definition of food wastage throughout this document is based on the EU legislation (see [36]).

durability dates has resulted in court cases?

Information

3. What information is available in the Netherlands and the EU on the use of product date information for foods?

Examples from practice

4. What are the options as regards using technical indicators to show durability?
5. What examples are there of the use of expiry dates in practice, and what can we learn from them as regards food wastage?

2 Approach

The part played by expiry dates² in food wastage is not clear from the figures in studies on the subject alone. If we want to reduce the food wastage resulting from expiry dates, we also need to look at what makes expiry dates the way they are at present, from various angles such as legislation, the information/communication provided by various bodies, and day-to-day practice, which sometimes involves alternatives whose positive or negative effect on food wastage is not known. This is set out in the diagram below. First we look at aspects that influence expiry dates as used at present (Chapters 3 and 4). We then examine the relationship between expiry dates and food wastage, concluding with examples of good practice and solutions to reduce food wastage based on technological innovations.

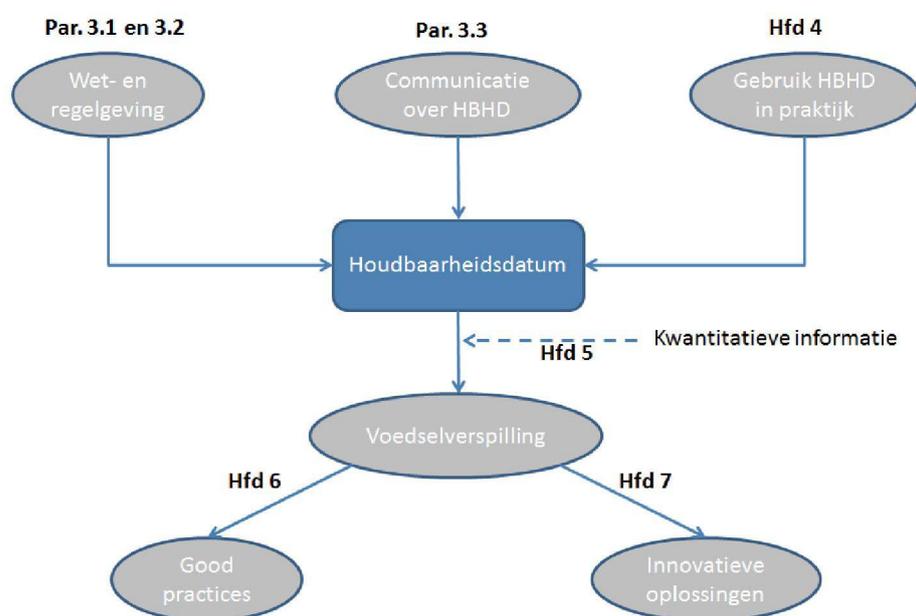


Fig. 1: Diagram of the approach

Chapters 3 and 5 are based entirely on desk research. For Chapter 4 we visited various supermarkets to gain some idea of how things work in practice. For both Chapter 4 and Chapter 6 we conducted telephone interviews with people in the various food industry sectors.

² These can be use-by or minimum durability dates.

3 Legislation and Guidelines on Expiry Dates

Companies in the food industry come up against all sorts of legislation and regulations, including how to deal with expiry dates. The problem is that they have to observe not only the Commodities Act but also regulations laid down by e.g. marketing boards. There are also worldwide standards that they can opt to comply with voluntarily. Communication on the legislation is provided by various organizations (including to consumers). The question is whether this communication is clear. This chapter examines these points.

3.1 Minimum durability and use-by dates: flexible or rigid? Memorandum on liability for the expiry of the date of minimum durability

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INTRODUCTION

Given the desire to reduce food wastage, some questions have arisen as to the possibility of changing date indications on food products and the liability of food business operators in this connection. If the indication of durability on the label of a food product has an excessive margin – i.e. the date is unnecessarily early – this can result in food being wasted, as good food is taken off the shelf or thrown away by consumers. Given this background, questions have been asked regarding the possibility of changing the statutory rules on indications of durability and on product liability, including the expiry of these dates.

The obligation to label a product with an expiry date rests with the food business operator who decides until when he is willing and able to guarantee the quality or safety of the product. This requirement exists under European law and cannot be changed at national level. Liability relates mainly to food safety, not to the expiry of dates as such. A conservative date indication can reduce the risk of liability.

QUESTIONS AND ANSWERS

Below we answer the following questions:

QUESTION 1

What is legally possible as regards changing the current legislation on the compulsory labelling of minimum durability dates on food products (abolition, replacement with production date, or adoption of the UK equivalent, 'best before')?

QUESTION 2

*If on a national level it is not possible **not** to label with a minimum durability date, how could the European legislation be revised?*

To answer these questions we examined how expiry date indications are laid down in the European legislation.³ Food information requirements are currently in force under European Directive 2000/13/EC, which has been implemented in Dutch legislation in the Food Labelling (Commodities Act) Decree in particular. With the entry into force of Regulation (EU) No. 1169/2011 a large part of the Decree will have to be scrapped, as the Regulation will apply *directly*: European legislation in the form of Regulations – unlike Directives – has direct effect. The substance of the Regulation and the Directive is virtually identical as regards expiry dates, but the Regulation is slightly clearer in that it defines ‘minimum durability date’ (see below). The statutory framework is outlined below.

The existing European legislation differentiates between minimum durability and use-by dates in Directive 2000/13/EC. The new Regulation on food information [(EU) No. 1169/2011], which must be implemented by December 2014,⁴ does not make any changes in this area; it does, however, lay down and develop the principles and scope of food information.

Article 4 of Regulation (EU) No. 1169/2011 lays down:

1. Where mandatory food information is required by food information law, it shall concern information that falls, in particular, into one of the following categories:

- (a) information on the identity and composition, properties or other characteristics of the food;
- (b) information on the protection of consumers’ health and the safe use of a food. In particular, it shall concern information on:
 - (i) compositional attributes that may be harmful to the health of certain groups of consumers;
 - (ii) durability, storage and safe use;
 - (iii) the health impact, including the risks and consequences related to harmful and hazardous consumption of a food;
- (c) information on nutritional characteristics so as to enable consumers, including those with special dietary requirements, to make informed choices.

Article 9 of the Regulation lists the mandatory particulars, including the date of minimum durability *or* the use-by date.

‘Date of minimum durability’ is defined in Article 2(2)(r) of the Regulation. The date of minimum durability is “the date until which the food retains *its specific properties* when properly stored”. ‘Specific properties’ can be interpreted as *quality attributes, including safety attributes*. Article 24 of the Regulation develops this.

(Article 24(1) of Regulation (EU) No. 1169/2011)

Minimum durability date, ‘use by’ date and date of freezing

³ Regulation (EU) No. 1169/2011 does not apply as regards minimum durability/use-by indications in the case of certain products – fruit and vegetables, some wines that are covered by European marketing standards, vinegar, sugar, etc. (see Annex 10 to the Regulation) – as the indication of durability is laid down in other or specific regulations.

⁴ The implementation date for the requirement in the Regulation to provide nutritional information is different.

In the case of foods which, from a microbiological point of view, are highly perishable and are therefore likely after a short period to constitute an immediate danger to human health, the date of minimum durability shall be replaced by the use-by date. After the use-by date a food shall be deemed to be unsafe in accordance with Article 14(2) to (5) of Regulation (EC) No. 178/2002.

Annex X to Regulation (EU) No. 1169/2011 indicates how the date opted for must be expressed. The Dutch and English versions are shown below (in the text box).

Annex X, Part 1

1. *De datum van minimale houdbaarheid wordt als volgt aangegeven:*

a) *De datum wordt voorafgegaan door de woorden:*

— „Ten minste houdbaar tot ...” *wanneer in de datumaanduiding de dag is vermeld;*

— „Ten minste houdbaar tot einde ...” *in de andere gevallen.*

Part 2 of the Annex includes the following text on the time limit for consumption.

a) *De datum wordt voorafgegaan door de woorden „te gebruiken tot ...”;*

b) *De vermelding in punt a) gaat vergezeld van:*

— *hetzij de datum zelf, of*

— *hetzij een verwijzing naar de plaats op de etikettering waar de datum is aangegeven.*

The particulars are followed by a description of the storage conditions. The English version of the text is as follows:

1. The date of minimum durability shall be indicated as follows:

(a) the date shall be preceded by the words:

— ‘Best before ...’ when the date includes an indication of the day,

— ‘Best before end ...’ in other cases,

(...)

2. The ‘use by’ date shall be indicated as follows:

(a) it shall be preceded by the words ‘use by ...’;

(b) the words in point (a) shall be accompanied by:

— either the date itself, or,

— a reference to where the date is given on the labelling.

The following conclusions can be drawn from the foregoing text.

Conclusions

As it is mandatory to opt for either a minimum durability *or* a use-by date, there is no way of replacing it with some other indication (e.g. production date). The use of both dates (the one possibly intended as a quality guarantee, the other as a guarantee of safety) is therefore not permitted. A different description is also not permitted: the descriptions that must be used are set out word for word (see above). All the language versions of the Regulation are authentic. It is true that – linguistically speaking – the term used in the English version (‘best before’) differs from that in the Dutch (or German or French) version, ‘*tenminste houdbaar tot*’ (= minimum durability), but using a different (milder) Dutch version (e.g. ‘preferably use by...’ or something similar) *would require a full procedure to revise the version* via the European

Parliament and the Council. Interestingly, the English text uses a milder version of the date of minimum durability ('best before') than the Dutch version, whereas both versions aim to express the same thing, namely the lower limit of durability. (The heading of Article 24 in the English version, shown above, begins with: 'Minimum durability date'). This could warrant initiating a revision procedure and provide arguments for revision.

The formulation of the use-by date in Article 24 ("likely after a *short period* to constitute an immediate danger to human health") implies that the use of the *minimum durability date* is not restricted to products that would never constitute a danger when perished. If a product is sold that is perished but still safe, the purchaser can demand a refund or replacement. In this case it is not safety that is at stake, solely the quality that can reasonably be expected based on the contract between the purchaser and the seller.

A minimum durability date does not give an unlimited guarantee of safety. On the one hand it is a quality guarantee (in the sense of 'best before'); on the other it is a *limited safety guarantee* given by whoever is responsible for the label information (lower limit: minimum durability date; upper limit: long term). Precisely what the 'long term' is depends on the nature of the food, how it is stored and its microbiological properties.

An expiry date is printed on *prepackaged* food products. Given the scope of the Directive/Regulation, the information is intended for consumers/caterers, not primarily for retailers [see Article 6 of the Regulation or Article 1 of the Directive]. This, however, does not mean that the retailer can ignore the printed minimum durability date and leave products on the shelf indefinitely. This would only be permitted if the minimum durability date was solely an indication of product quality, or if the product was known not to constitute a safety risk even after a long period.

It is up to the operator prepacking the food⁵ (or issuing instructions to that effect) to choose between a minimum durability and a use-by date: this is usually the manufacturer of the item, but it need not be (cf. private label products, or prepacking at the retailer's premises of products bought in wholesale). In effect, whoever prepacks the product (or has it prepackaged) and labels it with an expiry date has to make *two choices*: the *type of date* and the *actual '... by' date*.⁶ Type of date: whoever labels the product with the date opts for either a date of minimum durability *or* a use-by date. In other words, the product may lose its normal properties and durability over time, but the packer assumes – if it is labelled with a minimum durability date – that it will not become unsafe in the short term. If the product causes damage within a period within which consumers can expect it to be safe microbiologically, the manufacturer bears product liability (see below). If the manufacturer had wished to exclude any risk in this respect, it should have opted for a use-by date. Any product that becomes **unsafe before the expiry of the minimum durability or use-by date**

⁵ A food is prepackaged if the contents of the packaging can only be consumed after breaking the packaging.

⁶ This effectively means 'up to and including'.

is labelled with an *incorrect minimum durability or use-by date*. A product of this kind can be regarded as defective on leaving the factory gate. In this case the packer (usually the manufacturer of the product) is at fault. There are three possible grounds for this liability (and the co-liability of other parties in the supply chain): we shall discuss these now, along with the respective case law on product liability.

QUESTION 3

Is there case law on product liability/minimum durability date?

The assumption behind this question is that the sooner a minimum durability/use-by date comes after the date on which the food concerned is put into circulation, the greater the likelihood is that the date will have expired before the product has been consumed, hence the greater the likelihood that the food will be wasted. The aim of posing this question is to ascertain whether the risk of liability is a reason for traders to be conservative in setting minimum durability/use-by dates. In order to assess the potential liabilities of all the parties in the supply chain, we need to consider the liability regimes: if a trader cannot be forced to pay compensation under product liability, this may be possible via another route, namely unlawful act or contractual liability.

Three important sources of private-law liability for organizations in a food chain, then, are:⁷

- 1) Unlawful act: Article 6:162 of the Netherlands Civil Code
- 2) Contractual liability 6:74 NCC
- 3) Product liability: Article 6:185 ff.

1: Unlawful act:

Contravention of the Food Law Regulation (EC) No. 178/2002, Article 14⁸ is against the law. The Food Information Regulation explicitly states that food still on the shelf after the use-by date is deemed to be unsafe. This does not mean that food is not or cannot be unsafe before the use-by date (or any other date). As we have seen, it is *up to the packer* to choose the type of date and the actual date. A person can be held accountable for an unlawful act (for definition see Appendix 4) if he can be held to be at fault, or if the law or commonly held opinion attributes the cause of the damage to him. An example of holding accountable *under the law* is product liability. This is a risk liability: there need be no element of ‘guilt’ (or ‘fault’) for it to apply.

2: Contract (for definition see Appendix 4)

⁷ See Article 13 of the Product Liability Directive: the Directive does not affect rights under contractual or non-contractual liability. Conversely, a member state must not have another product liability regime in addition to the one intended by the Directive. In this connection see Case C-183/00 Sanchez-Medicina Asturiana SA (ECJ 25 April 2002).

⁸ In a nutshell, it is unlawful to place unsafe food on the market.

Selling a defective product can result in the award of compensation and/or rescission of the contract.

3: Product liability

For definitions of ‘product liability’ and ‘who is the producer’ see Appendix 4.

If the producer of the product cannot be ascertained, the supplier (this can be the retailer acting as the consumer’s supplier) is deemed to be the producer. This is not very likely to occur in practice in the case of prepackaged foods, as the packaging is required to state the name and place of business of the operator responsible for labelling⁹ (see Article 9 of the Regulation).¹⁰ The importer is deemed to be the producer for the purpose of product liability. In practice, then, a consumer can choose who to hold to account, the manufacturer, the importer, or the supplier of a raw material. The consumer, being the user/consumer of the product, bears the burden of proof that the product was defective at the time of consumption, that he or she has suffered damage, and that there is a causal connection between the defect and the damage [see Article 4 of the Directive]. A product is deemed to be defective *if it does not provide the safety that consumers are entitled to expect* [Article 6], taking all the circumstances into consideration, in particular in accordance with the Directive/Article 6:186 NCC: the presentation of the product [e.g. information on the label/website etc.], the reasonably expected use, and when the product was put into circulation.¹¹

The producer (the manufacturer or whoever is deemed to be the producer) has various ways of avoiding liability, including [Article 7 of the Directive]:

- It did not put the product into circulation.
- It is reasonable to assume that the damage did not exist when the product was put into circulation, or that this defect developed later.

In the context of *product liability* we consider both ways of avoiding liability for a defective product (i.e. unsafe food).

The concept of ‘putting into circulation’

For the definition of ‘putting into circulation’ see Appendix 4.

It follows from this that the manufacturer, by supplying its product to the retailer [other than the manufacturer or private label supplier], has put the product into circulation.¹² Thus the

⁹ Article 8(1) of the Regulation: The food business operator responsible for the food information shall be the operator under whose name or business name the food is marketed or, if that operator is not established in the Union, the importer into the Union market.

¹⁰ Food fraud is a matter of increasing concern, however, and could constitute a reason for applying this provision. There is also, of course, the possibility of faulty labelling and traceability.

¹¹ Non-availability of better technology is permitted as a defence [Article 7 of the Directive].

¹² The concept of ‘putting into circulation’ is interpreted differently when establishing the start of the limitation period. In that context putting into circulation is equivalent to leaving the producer’s production process and

retailer does not put the product into circulation *again* if it leaves the product on the shelf after the minimum durability date has expired.

Conclusions

A retailer that does not itself manufacture/pack the product does not have product liability unless:

- in its capacity as the supplier it is deemed to be the producer (which is unlikely in the case of prepackaged foods because of the tracking & tracing information on the packaging);
- it links its name to the product (private label): in this case it does have product liability, in addition to the other parties in the supply chain.

Nor can domestic law give a producer ‘more’ risk liability by means of more stringent legislation. This would be incompatible with the Directive, which leaves only limited scope for adaptation to national conditions or interpretation [Case C-402/03, the Skov judgment]. Nonetheless, a retailer has other sources of liability [see below].

The point at which the defect comes into being

To avoid product liability, a producer of an end-product or raw material can argue that the defect did not exist when the product was put into circulation. If the minimum durability date was incorrect as regards (1) the *time indication* (if the product perishes and thus becomes unsafe before or soon after the minimum durability date) or (2) a *different type of date* ought to have been used (this would have to be the use-by date, subject to the judgment of the court in a specific case), the defect already existed in the product (i.e. the contents + packaging, including the product information supplied) when it left the production facility. In that case the manufacturer bears product liability. The retailer can also be held liable, namely on the basis of unlawful act or contractual obligation.

Contractual liability

A consumer buying an item at a supermarket is entitled to expect that item to be safe. If this is not the case the retailer can be held to account, as it has not complied with the contract entered into in the supermarket that requires it to supply a safe product. A prepackaged product that remains on the shelf (say, under a manufacturer’s name or trade name) after the minimum durability date has expired, is being sold in the supermarket by a professional seller to an amateur purchaser. Whether a product is still safe *after the minimum durability date has expired* is a judgment that has to be made primarily by the professional retailer, not the amateur purchaser. In practice the courts generally hold the retailer accountable for damage caused by a product that has turned out to be unsafe. The retailer could hold the

being taken into a sale process in a form in which it is offered to the public for use or consumption. This would imply the point at which the product is offered to the supermarket. This earlier point is therefore not relevant when establishing liability (judgment in the O’Byrne case, p. I 1341).

purchaser to be partly liable if the purchaser could have seen from the appearance of the product that it would be unsafe to consume the item concerned, in which case the purchaser is responsible for part of the damage that he has suffered.¹³

Unlawful act

The food business operator under whose name or trade name a product is sold is responsible for the correctness of the information on that product. Incorrect minimum durability/use-by information means that it bears product liability and liability for contravention of a statutory requirement (Article 14 of the Food Law Regulation). A retailer that leaves a product on the shelf under the name or trade name of another manufacturer (e.g. the supplier of a top brand) *may* be liable in respect of an unlawful act if the product is unsafe (the retailer is contravening the law) and/or the retailer has not observed the care expected of a retailer. The burden of proof for an unlawful act normally rests with the claimant, i.e. the consumer. If a retailer *culpably* leaves a product on the shelf that is unsafe (the retailer could have known that...), it is liable in respect of the unlawful act. Here again we have a professional seller as against an amateur purchaser. In that case the courts will normally protect the weaker – less well informed – party.

Conclusion

A retailer that is not deemed to be the producer, or a retailer able to put forward a successful defence (the defence grounds are listed in Article 6:186 NCC) is not required to pay compensation. However, it can be liable towards the consumer, based on the contract¹⁴ that it has with him, or based on unlawful act (6:162 NCC: acting in contravention of the law or without the care required in transactions with the public).

3.2 Note on the text of the legislation

A minimum durability date is set for products that may not have the expected quality after that date. The information for consumers is designed to get them above all to use their senses to check whether they want to eat the product after this date or not. The minimum durability date does not provide much indication of food safety; it refers to the quality of the product. Also, the law says that the use-by date is for products that are perishable from a microbial point of view and that constitute an immediate danger to health after a short period. In the Netherlands prepackaged fresh meat and fresh-cut vegetables are important products with a use-by date. The product is deemed to be unsafe after the use-by date, after which it is illegal to sell it and consumers are advised not to consume it. The product is also unsafe after this date according to the Labelling Regulation. Under the legislation, however, this does not

¹³ As an aside, the purchaser can of course demand a replacement product (or refund of the purchase price), but this would usually not be commensurate with damage due to illness or worse.

¹⁴ 6:74 NCC: Any shortcoming in compliance with an obligation makes the debtor liable for the damage which the creditor suffers as a result, unless the shortcoming is not attributable to the debtor.

necessarily mean that ‘unsafe’ should be interpreted here as dangerous to health (Article 4 of Regulation (EU) No. 1169/2011, Article 14 of (EU) Regulation No. 178/2002). Strangely, a product is also deemed to be unsafe if it has merely become unfit for human consumption, e.g. as a result of microbial decay or ‘normal’ physiological loss of quality (ageing). This effectively deprives the use-by date of its status of safety date. A project widely supported in the industry involving fresh-cut vegetables ([49]) shows that the cutting plants have never had illness-related complaints or claims from customers. The explanation may lie in the foregoing.

3.3 Guidelines and supplements in the Netherlands and the EU on expiry dates

As pointed out in paragraph 3.1, legislation on expiry dates has been laid down at European level and implemented at national level in the Commodities Act. There are other sources in addition to this Act that are important for food companies in relation to expiry dates. There are two types: guidelines (voluntary) and rules or decrees (mandatory).

International recommendations

Companies that operate internationally are affected by guidelines that are usually product group-specific and that have (or can have) added value in international trade. Information on expiry dates can be found in specific regulations such as the Codex Alimentarius.¹⁵ The Codex operates internationally, but it is not legislation. It sets out standards that companies can opt to comply with voluntarily. They are concerned mainly with food safety, including labelling and hygiene.

Definitions of expiry dates are set out in the Codex Alimentarius, in the General Standard for the Labelling of Prepackaged Foods [32]. This contains the following information on the use of date indications on packaging (see text box):

Date Marking of prepackaged food:

“Date of Manufacture” means the date on which the food becomes the product as described.

“Date of Packaging” means the date on which the food is placed in the immediate container in which it will be ultimately sold.

“Sell-by-Date” means the last date of offer for sale to the consumer after which there remains a reasonable storage period in the home.

“Date of Minimum Durability” (“*best before*”) means the date which signifies the end of the period under any stated storage conditions during which the product will remain fully marketable and will retain any specific attributes for which tacit or express claims have been made. However, beyond the date the food may still be perfectly satisfactory.

“**Use-by Date**” (Recommended Last Consumption Date, Expiration Date) means the date which signifies the end of the estimated period under any stated storage conditions,

¹⁵ <http://www.codexalimentarius.org>

after which the product probably will not have the quality attributes normally expected by the consumers. After this date, the food should not be regarded as marketable.

This overview includes definitions of minimum durability ('best before') and use-by dates. Interestingly, in the context of the use-by date the Codex Alimentarius refers not to microbial safety but (as in the case of the minimum durability date) to quality attributes that will be expected by consumers. The production date, packaging date and sell-by date are also shown. These are dates that are particularly important to producers and retailers but might cause confusion among consumers.

The Codex Alimentarius sets out not only product-specific standards¹⁶ but also thematic compilations of product groups for which there are standards. Appendix 2 refers to a screen of various product groups and whether special instructions are provided on the use of expiry dates. For a producer, then, it is important to check in the case of each product whether there are specific standards and whether they provide special instructions on the use of expiry dates.

Rules/decrees

Most of the information on expiry dates is provided in the Food Labelling (Commodities Act) Decree, but the Dutch Commodities Act lists various decrees, some of them product-specific, that may contain special instructions on the use of expiry dates. Table 1 shows a screen of some Commodities Act decrees and whether they provide special instructions on the use of expiry dates. In addition to the Commodities Act decrees there are regulations issued by commodity boards/marketing boards/industry boards that may provide special instructions on the use of expiry dates. These are the Arable Farming Commodity Board, the Beverages Marketing Board, the Margarine, Fats and Oils Marketing Board, the Horticulture Marketing Board, the Livestock, Meat and Eggs Marketing Boards, the Fish Marketing Board and the Dairy Marketing Board. They are represented on the Food Legislation Marketing Board Committee. Appendix 2 also refers to a screen of relevant regulations issued by the Horticulture Marketing Board. The table below only lists those cases where there are special instructions on expiry dates.

Table 1: Supplements to the Food Labelling (Commodities Act) Decree relating to expiry dates

Special instructions on expiry dates	
Food Preparation and Handling (Commodities Act) Decree	Yes (see [35]). If a product is required to be stored at a temperature of 0-6°C or has a durability of less than five days: use a use-by date. A marketing, commodity or industry board can lay down further rules or take other decisions on this.

¹⁶ <http://www.codexalimentarius.org/standards/list-of-standards/en/>

Hygiene Code for the Potatoes, Vegetables and Fruit Retail Trade, based on the Hygiene of Foodstuffs Regulation (EC) No. 852/2004

Yes (see [33]). Perishable products such as salads, fresh-cut vegetables, raw vegetables and fresh fruit juice must be kept refrigerated. If no storage temperature is stated on the packaging, the maximum temperature for refrigerated storage is 7°C. The maximum durability is 48 hours at 7°C and 72 hours at 4°C.

3.4 Current communication on expiry dates from other than supply chain parties

Information on expiry dates, then, can be obtained from marketing boards, domestic legislation (the Commodities Act), European legislation and worldwide Codex standards. Various organizations make this information on expiry dates available to producers, retailers and consumers: in the Netherlands e.g. the Ministry of Health, Welfare and Sport, the Netherlands Food and Consumer Product Safety Authority, Stichting Milieu Centraal, the Netherlands Nutrition Centre and the Centraal Bureau Levensmiddelenhandel. Examples in Europe are the FSA (Food Standards Agency) and Defra (Department for Environment, Food and Rural Affairs) in the UK; the BMELV (Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz) in Germany; and the BIM (Brussels Instituut voor Milieubeheer) and FAVV (Federaal Agentschap voor de Veiligheid van de Voedselketen) in Belgium.

Table 2 compares the communication on expiry dates provided by these organizations. The sources for and background information on this comparison can be found in Appendix 3.

Table 2: Comparison of communication on expiry dates by the various authorities

Organization	Explanation of minimum durability/use-by date respectively	Additional information
Ministry of Health, Welfare and Sport	Quality/Safety	In the Commodities Act
Netherlands Food and Consumer Safety Authority	Quality/Safety	Expiry of expiry dates, differentiation between types of storage, advice on minimum durability dates for charities
Stichting Milieu Centraal	Quality/short durability	Advice on how long food remains edible after the minimum durability date has expired
Netherlands Nutrition Centre	Less perishable/highly perishable	Storage recommendations
Centraal Bureau voor de Levensmiddelenhandel (CBL)	Quality/highly perishable	Differentiation between types of storage

UK (FSA & Defra)	Quality/Safety	Decision tree for minimum durability/use-by date, no product-specific advice available
Germany (BMELV)	Quality/Safety	Sensory checking by consumer
Belgium (BIM)	Quality/quickly perishable, health risk	None
Belgium (FAVV)	Quality/Safety	Sensory checking by consumer

The information on expiry dates provided by the organizations surveyed is broadly consistent, and all of them provide additional information. The information from the Netherlands Food and Consumer Product Safety Authority is in line with the Commodities Act and the Food Preparation and Handling (Commodities Act) Decree. Interestingly, Milieu Centraal, the Netherlands Nutrition Centre and CBL are casual about the definition of ‘expiry date’, but this is possibly due to the fact that the current Commodities Act (and the European Directive) does not give a clear definition. In the new Regulation, which is yet to take effect, ‘minimum durability date’ is included under the Definitions heading. Individual interpretations will then no longer be possible. Milieu Centraal has its own interpretation of the use-by date (short durability), which does not relate directly to product safety. This interpretation may be based on the text of the Food Preparation and Handling (Commodities Act) Decree (see Table 1). The Netherlands Nutrition Centre differentiates between ‘less perishable’ (minimum durability date) and ‘highly perishable’ (use-by date), which is understandable, but this is problematic in comparison with Milieu Centraal’s ‘short durability’ for use-by date. For the sake of consumers, then, these organizations need to bring their explanations of minimum durability and use-by dates into line with the definitions in the EU Regulation as far as possible, so as to avoid potential confusion among consumers.

The information provided by the FSA (Food Standards Agency) and Defra (Department for Environment, Food and Rural Affairs) in the UK is based on the European legislation. The definitions of minimum durability date and use-by date are clear and based entirely on that legislation. They also provide a decision tree (see Appendix 3) to help with choosing between minimum durability (best before) date and use-by date. The steps in the tree are based mainly on factors that determine durability. No advice is given, however, on specific foods or product categories, as so many variables can occur in a product category that it is impossible to provide product-specific advice.

In Germany the information leaflet *Teller oder Tonne?* explains the distinction between ‘*Mindesthaltbarkeitsdatum*’ (minimum durability date) and ‘*Verbrauchsdatum*’ (use-by date) clearly and in accordance with the European legislation. It also provides instructions for consumers on how to deal with products whose minimum durability date has expired.

In Belgium the FAVV uses the correct terminology to define expiry dates (known as ‘*vervaldata*’ in Belgium, as opposed to ‘*houdbaarheidsdata*’ [durability dates] in the Netherlands). However, in some (not all) publications the BIM uses ‘*houdbaar tot...*’ (keeps until) whereas ‘*te gebruiken tot*’ (use by) is standard in the Netherlands. ‘*Houdbaar tot*’ (keeps until) for use-by dates is difficult to differentiate from ‘*tenminste houdbaar tot*’ (keeps until at least) for minimum durability dates. This could conceivably be a source of confusion.

Conclusions

- The information on expiry dates surveyed from the authorities, interest groups and the industry is broadly consistent.
- Despite the general consistency in communication from various non-commercial bodies to consumers on product date information, complete uniformity would be desirable so as to avoid confusion.

4 Expiry Dates in Practice

Durability and food safety are complex matters, not only for consumers but also for the industry, owing to both the legislation and commercial interests and quality-related characteristics, such as discolouration, odour, texture and so on, which can differ from one category/product to another in terms of standards and standard-setting bodies. This chapter sets out the considerations concerning expiry dates from the point of view of practice, with the aim of establishing a link with food wastage.

In this document we confine our considerations to practice in the most common supply chain:¹⁷

Producer —> Retailer —> Consumer

Food products are usually labelled with a date, often relating to production, sale or durability. Some products (such as fresh unpackaged vegetables) are not labelled with a date. The law lays down the constraints for this date information. If some form of product date information (PDI) is shown there are two aspects: (i) deciding what to put on the label and (ii) how to deal with PDI in practice. Both aspects could possibly have an effect on food wastage, as discussed below.

4.1 Creating product date information

As laid down in the legislation, two decisions need to be made: what type of PDI to use, and what date to set. These decisions are made by the producer and/or the retailer, who must comply with the legislation.

4.1.1 *Choosing the date information type*

As pointed out above, various types of date information occur on the various products: use-by date, minimum durability date, packaging date (or ‘packed on’), production date (see [37]), sell-by date or no date. The law currently permits this variability, under different conditions and depending on what specific products are concerned. It is not the case that there is always only one option as regards the type of date information for a particular product, and the production chain frequently makes use of this variability in those cases where the law permits. By ‘variability’ we mean that, while the law may lay down only one option in a particular case, other types of date information are permitted, e.g. where the product is repackaged or processed on the spot, or where a date is not mandatory but a particular type of date information is shown. Where there are multiple options permitted by law the choice may be made by the producer or the retailer, or both of them together. The considerations involved here are:

¹⁷ This does not mean that the results and conclusions cannot be extrapolated to other cases.

- What the law permits
- Opting for practical information in the interests of food safety and maximum clarity for consumers (N.B. this is a relative judgment) or giving an impression of freshness, which can be regarded as a quality aspect

An impression of freshness can be achieved either by opting for a different type of date information or by setting a much earlier actual date than is necessary.¹⁸ Nothing is known about commercial considerations as regards the type of date information, but a better understanding of those processes would enable the relationship between PDI and food wastage to be analysed more effectively. The researchers have not found any references that provide an understanding of the effect on food wastage of using stickers showing a sell-by or packaging date. Packaging dates on meat products on the shelves of various retailers mean that consumers have to decide for themselves whether they think the product is safe and of satisfactory quality.

4.1.2 *The actual date on the product*

The actual date set and printed on the product label plays a role in minimum durability and use-by dates; in the other cases the date is either set by the date of the process to which it refers or there is no date. The durability set by a producer is based partly on knowledge or research that the company itself has carried out or commissioned, plus achieving a balance (in consultation with the retailer or otherwise) between risk-averse behaviour in relation to health claims or giving an impression of freshness as referred to in 4.1.1 (ready meals are an example of setting an early expiry date to give an impression of freshness (see [38])) and the desire to be able to keep the product on the shelf as long as possible so that it can be sold and not thrown away (see [44]-[46]).

Food is wasted e.g. when the expiry date expires before the product is sold, as it does not usually reach its original destination of human consumption.¹⁹ Where the expiry date is set as late as possible it is highly dependent on the product, and this may require product development by the producer based on technological knowledge.²⁰

There are three ways of extending durability: preprocessing, production method and packaging. [14] gives a state-of-the-art overview of preprocessing techniques for the fruit and vegetable supply chain. [15] puts forward an idea for inhibiting food decay due to microbial growth. Another way of extending durability is to modify the production method, an example being mild conservation (see [19]). The third option is packaging that can increase durability.

¹⁸ See Zembla, 9 March 2012, *De kleinste soepfabriek*.

¹⁹ Food banks receive only a small proportion of the food wastage from retailers (Monitor Reductie Voedselverspilling study).

²⁰ As pointed out earlier, a later expiry date could be set for the product in its current form if the expiry date set hitherto is found to entail an extremely low risk. We do not discuss this option here.

This can be achieved not only by means of the familiar MA²¹ conditions associated with particular types of film but also by means of vacuum packaging or inserting certain oxygen-absorbing substances so that the product ages (loses its quality) less quickly.

An EU website showing the latest technologies in this area has recently been launched (see [18]). Later expiry dates are likely to reduce food wastage: this has been researched in simulations based on real-world cases (see [51], [52]).

4.1.3 *Creating product date information in practice*

Given the diversity and confusion, a comprehensive study of date stickers on food products has been carried out in the UK (see [39]). This study looked at some 10,000 products from some 10,000 stores in 2009 and 2011. How the options as regards the type of date information are dealt with in practice in the Netherlands is not known, so a small sample survey of eleven stores of various retailers in the Netherlands was carried out with the aim of examining how much variability there is with limited effort.

N.B. The aim of these store checks was to survey how much diversity there is in date stickers on food products. There was absolutely no intention to look at possible contraventions of the Commodities Act, as that would have required particular background knowledge that the researchers did not have. A quality assurance process might have been agreed with the Netherlands Food and Consumer Product Safety Authority, for example, allowing a different date sticker for the particular product. The sample comprised a limited range of products and was geographically distributed but random in terms of formula, and anything referring to a particular retailer was deleted from the photos so as not to suggest that it was responsible for this diversity. Also, we only report on the variability in PDI; it can therefore *in no way* be concluded that variability is the norm, only that it occurs. A very large-scale and time-consuming study would be required to make the survey of stores representative. There was no time to do this, as this report is intended among other things to answer the House of Representatives' questions in a broad sense.

Eleven retailers in North Holland, Gelderland and Limburg were visited in the spring and summer of 2012 to gain some idea of the use of expiry dates as communicated to consumers. The focus was on the product groups meat products, fish, vegetables, ready meals and bread. The results of the visits are shown in Table 3.

²¹ Modified Atmosphere, a technology whereby the gas conditions in the packaging are passively influenced by the permeability of the film to certain gases. Combined with 'breathing' products, this makes for longer durability.

Table 3: Use of expiry dates in various product groups. Source: store visits (this study)

Product group	Expiry date found
Fresh and unprocessed fruit and vegetables, usually unpackaged, but also prepackaged.	No date. Exception: mushrooms, also found refrigerated with a use-by date.
Fresh bread (wheat loaves)	Packaging date; sell-by date or date (without explanation) on the packaging or a clip; unpackaged without date at the counter.
Non-fresh bread (e.g. currant loaf, sugar loaf)	Minimum durability date
Prepackaged fresh meat, fresh fish and fresh-cut vegetables	Use-by date, but sometimes also minimum durability date (salmon steak)
Smoked fish	Minimum durability date
Prepackaged ready meals	Usually a use-by date, but minimum durability dates were also found (e.g. ready-to-eat pizzas)
Prepackaged salad meals	Use-by and minimum durability dates
Prepackaged cheese slices	Usually a minimum durability date, except for a few more exclusive or craft types, which have a use-by date.
Prepackaged prepared vegetables	Use-by date, minimum durability date or 'packed on' (e.g. boiled beetroot)
Meat products	Prepackaged often with a minimum durability date, but also a use-by date (red meat, craft foods or more exclusive types). Meat packaged at the point of sale for immediate sale was also found with a packaging date.
Dairy drinks and desserts	Minimum durability date

It should be noted that this was only a small sample and the results are merely indicative.

Example: fresh-cut vegetables were found with a use-by date, but also with 'packed on' and a minimum durability date (see Fig. 2). In all three of these examples one would expect a use-by date, based on the legislation (see [40]) – especially in the case of the product shown at the bottom, as it shows a storage recommendation of 0-4°C (see also [40]). When asked, the producer informed us that the spinach is fresh, merely washed and chopped, and has not undergone conservation. This is an example of the diversity found among similar products, i.e. fresh-cut vegetables.



Fig. 2: Top: Red cabbage sliced in half ('packed on') and salad meal (minimum durability); Bottom: Goat's cheese and spinach, with honey, shallot sauce and pasta; Right: zooming in on 'houdbaar tot en met' (keeps until) (photo 5 August 2012)

Other examples were also photographed. The diversity was found among similar²² products (e.g. fresh-cut vegetables (only washed)) at the same supermarket and among different supermarkets (e.g. fresh salmon steak). Another version of Table 3 shows that the types of date information are dealt with in various ways:

Table 4: Sticker dates used by product group. Source: this study

Product group	Sticker date found				
	Use	Min.	Packaging	Sell by	No

²² 'Similar' here refers to the same product category or sub-category combined with the type fresh, frozen or dry goods. Frozen fish is different from fresh fish.

Fresh and unprocessed fruit and vegetables, usually unpackaged, but also prepackaged					x
Fresh bread (wheat loaves)			x	x	x
Non-fresh bread (e.g. currant loaf, sugar loaf)		x			
Prepackaged fresh meat, fresh fish and fresh-cut vegetables	x	x			
Smoked fish		x			
Prepackaged ready meals	x	x			
Prepackaged salad meal	x	x			
Prepackaged cheese slices	x	x			
Prepackaged prepared vegetables	x	x	x		
Meat products	x	x	x		
Dairy drinks and desserts		x			

The diversity could either be due to the legislation, where the choice of date type is based on a reason that is not clear to the consumer at the time of purchase, or it could be a choice made by the manufacturer or retailer within the scope permitted by the law. A comprehensive study in the UK (see [39]) shows that the types of date information on food products are dealt with in various ways there too (this does not mean illegally!).

The question, then, is what effect this has on food wastage. Does the way in which date stickers are used – within the scope permitted by the law – affect wastage at a retailer, as consumers relate their purchasing behaviour or choice of date-stickered product on the shelf to the type of sticker? Nothing is known about this in the context of purchasing behaviour, but given the store checks carried out it is logical to assume that consumers – at the time of purchase – interpret minimum durability and use-by dates as ‘not very different’ (or do not notice the difference), as they find both minimum durability and use-by dates on similar products, and/or the difference is not a factor *at the time of purchase*. The retailer will no doubt have an explanation for its choice, but whether that explanation is (or should be) apparent to consumers is not known. Thus the date type – minimum durability versus use by, not the actual date – may not be a deciding factor at the time of purchase. This all becomes even more logical given that research into the relationship between food wastage and information on expiry dates does not make the distinction (e.g. CREM [6]). Clearly, more research is needed into the relationship between purchasing behaviour and types of expiry date and the actual date shown in the product date information.

4.2 How product date information is dealt with

How the three stakeholders – the producer, the retailer and the consumer – deal with PDI in

practice, in processes where there is a relationship with food wastage, is already known in the case of many processes. These are listed below but not discussed in detail.

Supply chain activities where consideration is already being given to the relationship between PDI and food wastage are set out in Waarts et al. (see [43]):

- Correct package size²³
- Good stock control
- Accurate ordering²⁴
- Timely price reduction
- Donating products coming up to their expiry date to charity
- Packaging that extends durability
- Processing of residues

Clearly, these activities reduce food wastage, but there are other processes where PDI could also affect food wastage. A highly relevant point here is what the considerations of the various stakeholders are when carrying out those processes, and conversely what effect those processes have on food wastage. In many cases nothing is known about both these issues, including whether the effect on food wastage is positive or negative. Suggestions can be put forward based on logic as to what processes it would be useful to examine in relation to food wastage. The main processes in this respect are discussed below:

Dates on products with a use-by date

Product groups that typically have a use-by date are fresh-cut vegetables and prepackaged fresh meat. Research (see [49]) shows that producers set the use-by date for fresh-cut vegetables based on sensory aspects such as appearance and odour. Thus loss of quality is more to do with a level that is unacceptable for a producer than the risks due to the growth of microbial pathogens. As the law requires a use-by date this has different associations than is normally the case. In the case of meat the *total* amount of bacteria – not the specific amount of pathogenic bacteria! – is often a criterion when setting the use-by date, as well as sensory aspects such as colour (see [50]). The amount is determined by random sampling. Microbial safety is guaranteed (up to and including the use-by date) not only by setting that date but also, of course, by complying with specific hygiene rules and testing random samples of products for pathogenic bacteria (in excessive amounts) up to the expiry date. While this does mean that the product is guaranteed safe up to the expiry date, it is not necessarily unsafe after that date. Thus in the case of fresh-cut vegetables the use-by date is more of a quality date than a safety date, similarly to the minimum durability date. In the case of meat the interpretation of the use-by date lies somewhere between food safety and quality, as the total amount of bacteria is measured.

²³ I.e. offering smaller quantities in a package; it should be noted that this will have a positive effect on reducing food wastage, but will require more packaging material.

²⁴ In the current context ‘accurate ordering’ means taking account of expiry dates so as to minimize food wastage. In practice this is easier for a discounter than a full-service retailer, where products should ideally not go out of stock.

Prepackaged fresh meat and fresh-cut vegetables (i.e. not frozen) keep for only a short period (typically five to seven days after production), so compared with other fresh products they are more likely to reach their use-by date in the store. As regards meat, in the home there is the option of storing it in the freezer, but in the store it is usually sold fresh, hence products in which a lot of energy has been invested are thrown away there in the belief that they could be unsafe, whereas the date is based on the producer's quality standards. This conclusion provides potential for reducing food wastage, but the other side of the coin is that if products are stored longer, e.g. using technology that gives a good idea of the risks, the food safety margin is reduced. There is a trade-off between the potential for reducing food wastage and food safety. Use-by dates instead of minimum durability dates have been found in the UK too (see [39]). As they are regularly accompanied by advice not to consume various products after the minimum durability date, it has been suggested that this is confusing consumers, as they may regard the minimum durability date as a safety date. An obvious solution to this issue in the case of meat is to find a technology that indicates the actual amount of pathogens instead of the total amount of bacteria. This could give rise to quality improvements that would allow later use-by dates.

How expiry dates are dealt with in commercial agreements (between the producer and the retailer)

Where agreements have been reached by the producer and the retailer on the type of date information and the actual date, the durability period that the producer wants to apply when selling a product to its customer may not meet that customer's requirements. This is not a case of food wastage, as the product is still within the expiry period. These products will probably find their way into other distribution channels. Depending on the producer this could be for human consumption (e.g. food banks, processing of residues into other foods (see also [15]) or sale at a reduced price). This is internal company information and therefore difficult to obtain. The project 'Groen(t)e technologie in catering'²⁵ looked at the relevance of expiry dates to wastage at producers that also produce for supermarkets. The part played by expiry dates was found to be negligible.

Purchasing behaviour (retailer-consumer)

The relationship between expiry dates and consumer purchasing behaviour in stores is found particularly in 'selection behaviour' ('rummaging'), by which is meant that a group of consumers looking at a product (especially fresh products) will opt for the product on the shelf with the latest expiry date. This makes for more food wastage. This behaviour is entirely understandable in the case of e.g. milk and desserts in the context of quality and food safety, as these factors cannot be assessed using sensory perception, unlike in the case of products such as meat that are in transparent packaging.

²⁵ Report available from the authors on request. [Translator's note: The title is a play on words: *groene* = green, *groente* = vegetables.]

The practice of cutting prices as products come up to their expiry date is also topical and transparent for retailers. This means that they are in a position to analyse the effect of price reductions on food wastage at their stores, but this is confidential information that they will not release.

Apart from expiry dates, product stickers for e.g. packaged fresh products are also found with packaging dates and production dates, however, and this study did not find any information on the relationship between these and food wastage. Using date information other than expiry dates results in two things that can confuse consumers:

1. The diversity of information on similar products designed to indicate their quality and/or food safety.
2. The value and usefulness of that information: for example, if a production date is shown instead of an expiry date (the use-by date is lost, for instance, if prepackaged meat products are repackaged at the point of sale), the average consumer will not know how long the food still remains safe, whereas an expiry date does give him a guide.

A whole host of studies and reports have found that consumers are confused by the diversity of communication concerning durability on product stickers, and this has even led to a motion being passed by the European Parliament (see e.g. [21]-[24]). Various EU countries are trying to come up with uniform simplified information on products, the outcome being a mandatory choice between minimum durability date, use-by date and no date (see also 3.1).

How the date is dealt with in the home (by consumers)

Date stickers affect food wastage in the home, by consumers, as well as at stores. It is only natural that, when it comes to food wastage, consumers deal with packaging and sell-by dates differently from expiry dates. According to the law the use-by date is an important indicator of food safety, whereas the minimum durability date is an indicator of quality, which – possibly in conjunction with sensory perception (taste, odour, appearance) – determines when food is thrown away. Without an expiry date (i.e. with a packaging or sell-by date or nothing) the consumer has to decide, and the decision will depend on the combination of the knowledge that he/she has and sensory perception. In this latter case the outcome will depend far more on the consumer, whereas an expiry date (where it is a legal requirement) is likely to reduce variability in food wastage, as it provides a point of reference for quality or food safety, with the result that less food is thrown away based on diversity of consumer behaviour.

At the start of this section, under the heading **Dates on products with a use-by date**, we pointed out that fresh-cut vegetables and meat have a use-by date that in reality is a quality reference in the case of fresh-cut vegetables but a reference for something between quality and food safety in the case of meat. Consumers may therefore be throwing products away too

soon because they associate the use-by date with food safety. Only one extensive study has been carried out into how consumers deal with products with an expiry date in the home (see [6]). This is discussed in Chapter 5.

Conclusions

- Indications have been found that manufacturers and retailers use different date types for similar products. This could either be due to the legislation, where the choice of date type is based on a reason that is not clear to the consumer at the time of purchase, or it could be a choice made by the manufacturer or retailer within the scope permitted by the law.
- It is unclear what choices manufacturers and retailers make as regards expiry dates.
- Use-by dates are linked with food safety in various communications (see 3.4), but in reality this link does not always exist. In the case of fresh-cut vegetables the use-by date is more of a quality date than a safety date, similarly to the minimum durability date. In the case of meat the interpretation of the use-by date lies somewhere between food safety and quality, as the total amount of bacteria is measured.

Based on the foregoing, the following assumption is plausible but untested as yet:

- Consumers may throw fresh-cut vegetables and meat away based on the fact that the products have passed the use-by date before they have become unsafe. One recommendation in the case of meat is to develop technology that provides information on food safety, so that later use-by dates can be set as a result of improved quality, hence less food will probably be wasted.

5 The Relationship between Expiry Dates and Food Wastage

We have looked at expiry dates from the point of view of legislation, communication and practice. These are the elements that provide an understanding of how expiry dates have come to be used and the underlying ideas. We have developed this understanding because we assume that the use of expiry dates is related to food wastage, as has been touched upon regularly in the preceding chapters. It is clear that there are other causes of food wastage, such as poor planning of purchases by consumers, or incorrect ordering by retailers,²⁶ but this study is confined to product date information. This chapter sets out what *quantitative* information there is on these relationships.

5.1 Existing research on how expiry dates are dealt with

No references have been found on the effect of the diversity in the use of date stickers at retailers on food wastage at stores. The UK study mentioned earlier (see [39]) points out that research into this effect is needed to gain a better idea of the relationship between food wastage and date type and actual date. At stores the relationship between the use of date stickers and food wastage could be ascertained by varying the use of stickers and/or the dates on them. Whether any such research has been carried out is not known. There are indicative published research results on how consumers deal with expiry dates in the case of fresh products and long-life products. A brief account of these results is given below.

ResCon (Netherlands): (2010) (see [41])

This survey asked consumers (n = 863) what they did when a product's minimum durability date had passed. About 25% of them threw it away, and just under 73% checked whether the product was still OK and ate it if it was.

OVAM (Belgium): (2011) (see [42])

Recent research shows that 71% of Flemish consumers eat food that has expired. This is usually canned foods, rice, crisps etc., so the minimum durability date has passed but there is little danger to health. Products that had passed their use-by date were also eaten in some cases.²⁷

WRAP: (2012) (see [39])

This is a comprehensive study of the use of product stickers in the UK. As all sorts of expiry dates are used willy-nilly on food products, serious action has been taken in the UK to reduce this diversity to only 'use by' and 'best before'. For this purpose a survey of over 10,000 products in thousands of stores was carried out.

²⁶ Retailers sometimes opt for a high service level and a broad range, which causes more food wastage (as a result of dates): see [53].

²⁷ This shows that this study differentiated between minimum durability and use-by dates.

A comparison of the situation in 2009 with that in 2011 shows that variability in the use of product stickers has been reduced. In spite of the size of this study, however, it did not provide any information on the effect on food wastage, and the report suggests that further research should be carried out on the subject. It includes merely one example (cheese) showing that if ‘best before’ is replaced with ‘use by’ the percentage of people who would still eat it after that date falls from 75% to 69%.

The studies mentioned above are merely indicative and only discuss consumer behaviour as regards throwing away food in relation to expiry dates. Nowhere, unfortunately, do they draw any quantitative conclusions on the amount of food wastage resulting from that behaviour. We discuss this in the next section.

5.2 How much do minimum durability dates contribute to food wastage in the Netherlands?

In this section we make an estimate based on prior research ([6]) of food wastage by consumers due to the way they deal with minimum durability dates. The term used here and in the title of this section is ‘minimum durability’, not ‘expiry’, as the study it refers to only looked at minimum durability dates. The main contribution to food wastage in terms of weight is to be found in the fresh products categories, both in the supply chain ([1], [2]) and by consumers ([3], [4]). If we look at the proportion of food wastage due to products having expired, we find that fresh products play an even greater role ([4], [5], [6]). It is fair to say that only a small proportion of long-life products contribute to food wastage as a result of passing their expiry date. An interesting point here is that there is not much food wastage by consumers in the case of fresh products as a result of passing their expiry date. The following table, based on [6], shows the product categories that cause food wastage in percentage terms:

Table 5: Annual food losses among Dutch consumers
Composition of food losses in Dutch households (2010)

Product category	Kg per inhabitant per year	Fresh	Long-life	Cause = expiry date (%)
Meat	2.5	2.5		27
Fish	0.07	0.07		27
Cheese	0.5	0.5		18
Dairy products	5.4	5.4		41
Eggs	0.2	0.2		46
Vegetables	5	5		31
Fruit	4.3	4.3		
Potatoes	4.8	4.3		
Bread	7.5	7.5		
Rice	2.9		2.9	
Pasta	2.1		2.1	
Sweets and snacks	0.4		0.4	
Sandwich filling	0.2		0.2	
Sauces and fats	2.2		2.2	38

Soups	0.3		0.3	
Beverages	3.9		3.9	38
Other	1.5		1.5	
Total	43.77	30.27	13.5	

Of the 73 kg thrown away per inhabitant per year, about 29 kg is not counted as true food wastage, e.g. peelings, bones, coffee grounds, etc. (none of this quantity of food waste is expiry date-related). Of the remaining 44 kg (43.77 kg in the Table) the majority is fruit, vegetables and potatoes – categories where an expiry date is only required if they are processed and packaged, which constitutes only a small proportion. Fresh bread intended for consumption within 24 hours does not have an expiry date either. Only in dairy produce is there a fair proportion of food wastage due to expiry dates (this is confirmed in the UK, where it is slightly higher [4]); [11] argues that expiry dates are a minor cause in the EU, at about 20%; expiry dates are said to contribute little to wastage in Norway too ([12]). In total about 10% of food wastage by consumers in the Netherlands is related to the expiry dates on fresh products.²⁸ In the same way it can be deduced that in the case of long-life products (sauces and fats, beverages) just over 5% of wastage in terms of weight is related to expiry dates. In total, then, 15% of food wastage is caused by passing the expiry date.

In the rest of the supply chain too (prior to the consumer) expiry dates would seem to play a minor role in relation to food wastage, except in the retail trade ([24], [54], [55]). Various studies of food wastage in supply chains ([7], [8], [56]) have put forward various causes not mentioning expiry dates. Other research by Wageningen University and Research Centre has surveyed causes throughout the food industry where expiry dates play hardly any role. Only a student's thesis ([9]) suggests that expiry dates are a problem in the production chain.

In the retail trade the use of expiry dates in the case of meat is the main cause of food losses, along with public holidays and promotions.²⁹ In the latter case the expiry date is an indirect cause, because if a retailer buys in too much because it is unable to estimate sales correctly, chilled fresh products will ultimately pass their expiry date. Expiry dates are therefore an important issue when it comes to wastage in the retail trade. A retailer will of course have some idea of how much food it is wasting,³⁰ but (i) it will rarely expose this in public and (ii) the distribution of that food wastage among expiry dates, public holidays and promotions is not always known.

Conclusions

²⁸ Sum of the last column (%) multiplied by the weight in the Fresh column, e.g. 27% x 2.5 kg meat. In the case of vegetables we used data from [13], which states that 'pan-ready' products (short minimum durability, as opposed to fresh without minimum durability date) account for 31% of sales in the Vegetables category. These calculations combine two sets of research findings, which is statistically unsound, but the results are more than indicative.

²⁹ FBR carried out a study in this context in the Meat category, which found proportions of food wastage of 1/3, 1/3 and 1/3 for expiry dates, public holidays and promotions respectively.

³⁰ For example Bart Groesz at PLUS (see Chapter 6).

- There is no information on the relationship between the use of date stickers and food wastage, nationally or internationally.
- Of total food wastage by consumers in the home, 15% is related to passing the expiry date.

6 Good practice

Food wastage attracts a lot of attention in the media, encouraging companies and supply chains to reduce that wastage. Some practices are already common, as set out in paragraph 4.2. This chapter describes the more unusual examples of good practice so that they can serve as models for other stakeholders.

The Colruyt case: minimum durability of at least seven days

In their stock control Colruyt supermarkets try to ensure that consumers can store their perishables at home for at least seven days before the expiry date. In the case of frozen products the period is longer, namely four to six months. The distribution centre sends products that are coming up to their expiry date to a food bank three days before they expire. Good stock control keeps this quantity to a minimum. Staff carry out daily rounds of the supermarkets with hand-held computers checking the stock levels, and goods are ordered daily based on that information. This is an effective system that avoids products expiring.

Source:

- Interview with Tony de Bock, Colruyt, 11 July 2012

The Boni case: better stock control in stores as a result of new bar code

A few Dutch supermarkets have started using a new bar code to improve control both of stocks and expiry dates. One example is the Boni supermarket chain, with 33 stores, which intends to tackle losses of fresh products (meat, fresh-cut vegetables and fish) using the GS1 DataBar.³¹ These products are scanned on arrival and when they leave the store so that the computer knows precisely how many products are still in the store and what their expiry dates are. Boni envisages saving some 1 million euros a year in this way. Until now Boni has carried out manual checks on expiry dates in stores, placing discount stickers on products when they are coming up to their expiry date. This is not only labour-intensive but also susceptible to fraud, as the stickers can easily be moved to another product. Using the GS1 DataBar Boni can control price-cutting automatically. Food wastage at the stores is expected to be reduced by being able to reduce prices in time and with ease, but no data has been published on the subject.

Source:

- <http://www.gs1.nl/opinie/rubriek/achtergrond/106-supermarkten-binden-strijd-aan-met-voedselverspilling.html>

³¹ The GS1 DataBar is a new version of the bar code which can contain more information, such as a minimum durability date.

The case of the PLUS supermarket in Rozenburg: processing of residual flows

The proprietor of the PLUS supermarket in Rozenburg, Bart Groesz, was fed up with the amount of food wastage at his store. His supermarket's performance is within the standard limit of 1.5% loss of turnover within the PLUS cooperative, but in his case it means throwing away 130,000 euros a year. He calculated that the annual loss for all supermarkets in the Netherlands amounts to 600 million euros. His butcher now checks every day what products have reached the day before their use-by date so that the price can be reduced. At this PLUS store product prices are reduced not on the last day (common practice at other supermarkets), but on the day before that. Once they have reached the use-by date they cannot be sold the next day: at the end of the day he turns these products into stews or casseroles or other dishes. These ready meals can then be sold for another two days, but the customers do not know where the ingredients come from. It's a dilemma: if you tell them that the ingredients have come from products that have been taken off the shelf and that other supermarkets would throw away – even if it is because they have reached their use-by date or because of one rotten potato in a whole bag – they won't want it, they think it would have been thrown away. On the other hand, you can use a different style of communication, for example saying in certain cases that products are actually tastiest when they are around their use-by date, as they are then ripe.

Bart Groesz would therefore like to move towards a system where the 270 PLUS supermarkets collect and process all residual flows centrally. This is already happening in the case of bread. The residual flows can be regarded as raw materials for new products. The product leaves the store; the customer does not see it. The flows are also larger if they are collected centrally. In an experiment 60 stores have already collected tomatoes from the residues and turned them into soup. Bart surveyed the flows at his store in collaboration with FBR (part of Wageningen University and Research Centre). Eighty percent of the residual flows are fresh products, of which 40-50% is still usable. In the next stage of the project he is trying to achieve a return flow of vegetables, and other product groups are to follow. Only in the case of meat will this be difficult: once it leaves the store it is downgraded to 'Category 3 material' (under the Regulation on animal by-products) and this meat is no longer fit for human consumption. The PLUS supermarket in Rozenburg sells both fresh bread and yesterday's 'stale' bread. Proprietor Bart Groesz has had special stickers made for the 'stale' bread, saying 'Baked yesterday, special value today'. At other supermarkets unsold fresh bread is usually sent back to the bakery the next day, where it is pulped, turned into pet food or breadcrumbs or burned. Bart estimates that 10-15% of bread has to be sent back in the normal course of events. "In itself that's a good thing, as it isn't discarded. But it's better to sell it, as it's then still being used for human consumption." He thinks that his bread supplier would also be happy to be rid of the return flow. And his customers are responding positively: "They're taking it on board."

Sources:

- Interview with Bart Groesz, PLUS supermarket in Rozenburg, 26 June 2012.
- <http://zembla.vara.nl/Voedselverspilling.10861.0.html> (transcript of the broadcast)

The Waitrose case: donating products coming up to their expiry date to charity

Waitrose is a UK supermarket chain that would like to ensure that no food waste or residue whatsoever ends up in landfill by the end of 2012. Their organic waste is currently anaerobically digested, not tipped. However, on 3 July 2012 Waitrose pledged to donate all its good surplus food to charity (food banks) until the end of 2012. The principle of donating to food banks is not new, but the integrated approach to ensure that it is properly organized and systematic is. Most surplus food is food that is coming up to its sell-by date. Another example of good surplus food is damaged food that is perfectly edible. Food that is no longer edible is anaerobically digested.

All 203 Waitrose stores in the United Kingdom are to take part in this. To make it easier for all the stores to take part, arrangements have been made with regional and national distribution organizations that give food to local charities on behalf of the supermarkets.

Sources:

- <http://www.waitrose.presscentre.com/Press-Releases/Waitrose-makes-commitment-to-donate-surplus-food-to-charities-across-the-UK-910.aspx>
- Exchange of e-mails with Suzanne Hetherington, 10-17 July 2012

Conclusion

- A number of supermarket chains are working on reducing food wastage due to expiry dates.
- The effects of these experiments by the various supermarket chains on food wastage have not been published.

7 Using Technical Indicators of Actual Durability

When fresh products leave the producer, either information on durability is communicated by means of a minimum durability or use-by date or nothing is communicated (e.g. unpackaged fruit and vegetables and bread). In both cases the information provided on the actual durability further down the supply chain is limited, resulting in food wastage (due to uncertainty regarding safety or risk-averse minimum durability/use-by dates). The producer assumes that the product will pass along the chain under certain conditions, which is generally the case, but the minimum durability/use-by date on the product cannot anticipate what will happen to it further down the chain.

It would be ideal to know the actual quality level of each product and at the same time be able to measure it instantaneously. That is a major scientific challenge. As expiry dates have never resulted in court cases, it is statistically likely that they are set conservatively. Based on that reasoning, information on actual durability would reduce food wastage. Innovative technologies are already being developed that are dynamic and dependent on either measured conditions combined with initial information (biomarkers, time-temperature indicators: see [16], [17]) or the actual changes in the product (e.g. freshness indicators [18] or ripeness indicators [25]). These technologies are still under development.

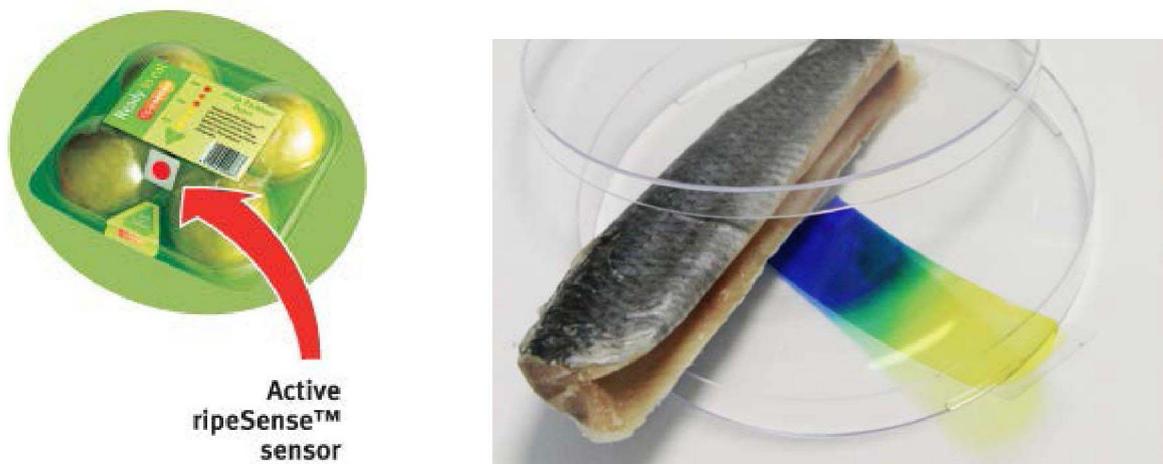


Fig. 3: Ripeness sensor for fruit and freshness indicator for fish and meat

The fact that the technologies are not in common use is due not only to their reliability and/or quality; the legislation can also be an impeding or delaying factor, as can the cost involved.

8 Conclusions

- (a) As a result of new EU legislation that comes into force in 2014, in the case of packaged products either a minimum durability date or a use-by date will have to be used in the Netherlands. The difference from the current situation is that it will not be possible to use a different date indication (e.g. a production or packaging date). The use of both dates (the one possibly intended as a quality guarantee, the other as a guarantee of safety) is therefore not permitted. A different description is also not permitted: the descriptions that must be used are set out word for word in the legislation.
- (b) The manufacturer/producer can be held to account under product liability for setting a wrong expiry date. A retailer selling under a private label is deemed to be the producer, as it links its name to the product. In the case of fresh-cut vegetables a broad delegation from the industry and the Food and Consumer Product Safety Authority said in 2007 that no illness-related claims or complaints had ever been made.
- (c) If later expiry dates were to be set it is highly likely that there would be less food wastage.
- (d) Indications have been found that manufacturers and retailers use different date types for similar products. This could either be due to the legislation, where the choice of date type is based on a reason that is not clear to the consumer at the time of purchase, or it could be a choice made by the manufacturer or retailer within the scope permitted by the law. The diversity can cause confusion among consumers. To what extent this diversity affects food wastage, either at stores or in the home by consumers, is not known.
- (e) About 15% of what Dutch consumers throw away is related to passing the expiry date: 10% of this is accounted for by fresh products and 5% by long-life products. There is little quantitative information published on the relationship between production date information in general (minimum durability, use-by, sell-by and production dates) and food wastage. According to indicative research, about 75% of the population carry out sensory checks on expiring products to see whether they are or appear safe.
- (f) Based on conclusions (a) and (e), El Fassed's motion to abolish expiry dates for long-life products is either not feasible or not particularly worthwhile due to (i) the trend in European legislation and (ii) the expected potential for reducing food wastage.
- (g) Examples of good practice show how food wastage could be reduced, but there are no published figures on the subject. Publishing information on the impact of experiments of this kind on wastage could enable that wastage to be reduced even further.
- (h) The communication (by organizations other than those in the supply chain) on product date information to consumers is broadly consistent.

9 Discussion

The law does not currently allow for expiry dates to be replaced with some other system. The EU will give off a clear signal in legislation in 2014 by requiring uniformity as regards date information on food products, so we need to seek solutions to food wastage related to expiry dates within these constraints. An important debate is in progress on changing expiry dates, namely (i) setting later expiry dates and (ii) setting earlier expiry dates. There can be various reasons for setting later expiry dates. Firstly, there may be scope when estimating the initial conditions as regards both quality and food safety. As each company does this individually, so there are no standardized methods or measurement frequencies, it is likely that some companies will play it safe more than others. There may be opportunities here, by introducing standardization or otherwise. As there are supermarkets that would like to set later expiry dates for products, this is a competition tool, hence also an incentive to the producers that make the products concerned.

Secondly, we have seen that in the case of the product groups prepackaged fresh meat and fresh-cut vegetables the use-by date is more of a quality date than a food safety date, and this may be causing unnecessary food wastage. Whether this potential should be utilized is a question of balance between the magnitude of the expected reduction in food wastage and the estimated increased food safety risk from storing the product longer. The government's primary consideration is food safety. In the case of meat it may be possible to develop technology that measures only pathogens instead of all bacteria (see 4.2), which would provide a good idea of the food safety date. The use-by date could then be set later, as it would be clear when there is a food safety risk.

Yet another aspect related to expiry dates is technology. Despite the fact that it is clear that the legislation will continue to require expiry dates in Europe, 'smart' indicators could provide *additional* information on whether the quality of a product is still good, so as to help a consumer who is uncertain about this or does not have enough product knowledge to decide whether or not to throw it away. More technology could however have the side effect of introducing yet more variability, which could confuse consumers. Consideration would need to be given to limiting diversity when introducing these technologies. Technology can also help to extend actual durability, for example by using different production processes and/or types of packaging, and these possibilities have not yet been exhausted.

As well as setting later expiry dates, there could be commercial reasons for bringing them forward. This would promote turnaround speeds at producers and might also make for an impression of freshness. It would seem to cause more food wastage, as products would have to leave the shelves sooner.

10 Recommendations

- (a) Based on conclusion (c) we recommend investigating whether later expiry dates could be set for fresh products as currently found in stores (i.e. without modification).
- (b) On top of this, technologies that could extend actual durability are increasingly coming on stream. If longer durability goes hand in hand with lower food losses there are opportunities rather than risks here for food manufacturers and supermarkets. This would involve such things as mild conservation, drying, smarter packaging and so on.
- (c) The relationship between product date information and food wastage is twofold: (i) what type of product information is put on the product (minimum durability date, packaging date, etc.) and (ii) the actual date set. As regards food wastage the important point is how the parties in the supply chain (producers, retailers and consumers) deal with this information. In practice we find that commercial reasons can result in early expiry dates being set (to give an impression of freshness), whereas reducing food wastage would benefit more from later expiry dates. The effects on food wastage of using one type of date information rather than another are not known, and the recommendation to the industry is to carry out further research into this.
- (d) Despite the general consistency in communication from various non-commercial bodies to consumers on product date information, complete uniformity would be desirable so as to avoid confusion.
- (e) If there were technologies capable of assessing the quality of food products in real time, these would be an important tool for reducing food wastage in the home. These technologies are under development, but not yet in common use, partly because strict legislation applies. Research into these technologies is already being carried out in various parts of Europe. Whether they will influence consumer behaviour in terms of wastage still needs to be investigated.
- (f) Carry out research into whether there are producers that have brought expiry dates forward and what effect this has had on food wastage.