Date Marking

User guide to Standard 1.2.5 – Date Marking of Packaged Food

July 2001

Contents

Background

In this user guide, the 'old Code' means Volume 1 of the *Food Standards Code* (the Australian *Food Standards Code*). The 'new Code' means Volume 2 of the *Food Standards Code* (the Australia New Zealand *Food Standards Code*). The 'New Zealand regulations' means the New Zealand *Food Regulations 1984*.

In adopting the new Code in November 2000, the ministerial council agreed to a two-year transition period. After this, the new Code will replace both the old Code and the New Zealand regulations.

During this two-year phase-in period, foods in Australia may comply with either the old Code or the new Code (but not a combination of these). In New Zealand, foods may comply with the old Code or the new Code or the New Zealand regulations (but not a combination of these).

After this, the old Code and New Zealand regulations will be repealed and all food sold in Australia and New Zealand will have to comply with the new Code.

The new Code will mean changes in the way manufacturers and retailers make and present food for sale.

The Australia New Zealand Food Authority (ANZFA) has developed this user guide, in consultation with Australian and New Zealand government and industry representatives, to help manufacturers and retailers interpret and apply Standard 1.2.5 – Date Marking of Packaged Food in the new Code. The guide may also be used by food officers to help interpret food standards in the new Code.

This user guide, unlike the standard itself, is not legally binding. If in any doubt about interpreting the standards, you should seek independent legal advice.

As well as complying with food standards requirements, you must also continue to comply with other legislation. In Australia, this legislation includes the *Trade Practices Act 1974*, the *Imported Food Control Act 1992* and State and Territory Fair Trading Acts and Food Acts. In New Zealand, this legislation includes the *Food Act 1981* and *Fair Trading Act 1986*.

Purpose

This guide is intended to help manufacturers decide whether food should be date-marked with a ‘best-before’ or a ‘use-by’ date. The date marking provisions are set out in Standard 1.2.5 – Date Marking of Packaged Food in the new Code. The standard applies to packaged foods with a shelf life of less than two years.

What is date marking?

The intention of date marking is to provide a guide to consumers on the shelf life of a food in terms of food quality. This means the length of time a food should keep before it begins to deteriorate. In some circumstances, date marking may also indicate how long a food can be expected to remain safe.

What has changed?

Previously ‘best-before’ and ‘use-by’ dates could be used interchangeably on food labels. Under the new Code, manufacturers must apply a ‘best-before’ date unless the food needs to be consumed within a certain period because of health or safety reasons (see *Health issues* and *Safety issues*). In such circumstances, the food must be date-marked with a ‘use-by’ date.

This change has been made to make it easier for consumers to understand date marks on food labels. It will enable them to distinguish between products that need to be consumed by a certain time for health or safety reasons (those with a ‘use-by’ date) and those that do not (those with a ‘best-before’ date). The new requirements also bring Australia and New Zealand into line with international food standards, where the ‘best-before’ date is the main date marking term used.

Foods that are date-marked with a ‘best-before’ date can continue to be sold after that date provided the food is not damaged, deteriorated or perished.

Foods that are date-marked with a ‘use-by’ date are prohibited from being sold after this date because the food may then pose a health or safety risk.

The following are other important changes to the date marking requirements:

- the ‘packed on’ date cannot be used on its own—if it is used it must be in addition to the ‘best-before’ or ‘use-by’ dates;
- food with a shelf life of 90 days or longer is not exempted from date marking (as was the case in New Zealand)—all food with a shelf life of less than two years must be date-marked; and
- alcoholic beverages and soft drinks must be date-marked if they have a shelf life of less than two years.

What foods need to be date-marked?

The standard requires all packaged foods with a shelf life of less than two years to be date-marked in accordance with the standard. Apart from the foods that are generally exempted from labelling requirements in Standard 1.2.1 – Application of Labelling and Other Information Requirements, some specific exemptions from date marking also apply to small packages of food and individual serves of ice cream.

What is a ‘best-before’ date?

A ‘best-before’ date is the last date on which a food can be expected to retain all of its quality attributes, provided that it has been stored in accordance with any stated storage conditions. Quality attributes include things such as colour, taste, texture and flavour, as well as any specific qualities for which express or implied claims have been made. For example, the freshness of the food or certain vitamin levels.

A food that has passed its ‘best-before’ date may still be perfectly safe to consume, but its quality may have diminished.

Food date-marked with a ‘best-before’ date can be sold after this date, provided the food is not damaged, deteriorated or perished. It is an offence under New Zealand and Australian State and Territory Food Acts to sell food that is damaged, deteriorated or perished at any time, regardless of whether the food is within its specified date mark or not.

What is a ‘use-by’ date?

A ‘use-by’ date is the last date on which the food may be consumed safely, provided that it has been stored in accordance with any stated storage conditions. After this date, the food should not be consumed because of health or safety reasons.

Food date-marked with a ‘use-by’ date cannot be sold after this date, as the food may no longer be safe.

The ‘use-by’ date is restricted to those foods where there may be a health or safety issue. This enables these foods to be readily identified by consumers as being different to foods date-marked with a ‘best-before’ date.

How do I decide whether to use a ‘best-before’ or a ‘use-by’ date?

The manufacturer is responsible for determining whether a ‘use-by’ date or a ‘best-before’ date should be used. To do this you must consider whether there are any health or safety issues associated with the food you manufacture in terms of its shelf life. Decision trees to help decide are included below.

Health issues

Health issues address nutritional concerns with certain foods where the nutritional profile can be critical to the health of the consumer. This only happens where a food is intended to form the sole source of nutrition in a person’s diet for a specified period.

Special dietary foods manufactured to provide the sole source of nutrition for people who are ill or who are unable to eat normal foods are an example of this. In these instances, the food needs to contain the exact amount of nutrients to ensure an adequate diet. Some nutrients are not stable and the amount of these in a food will decrease over time. Therefore, these foods need to be consumed within a certain period to ensure that the correct amounts of nutrients are provided.

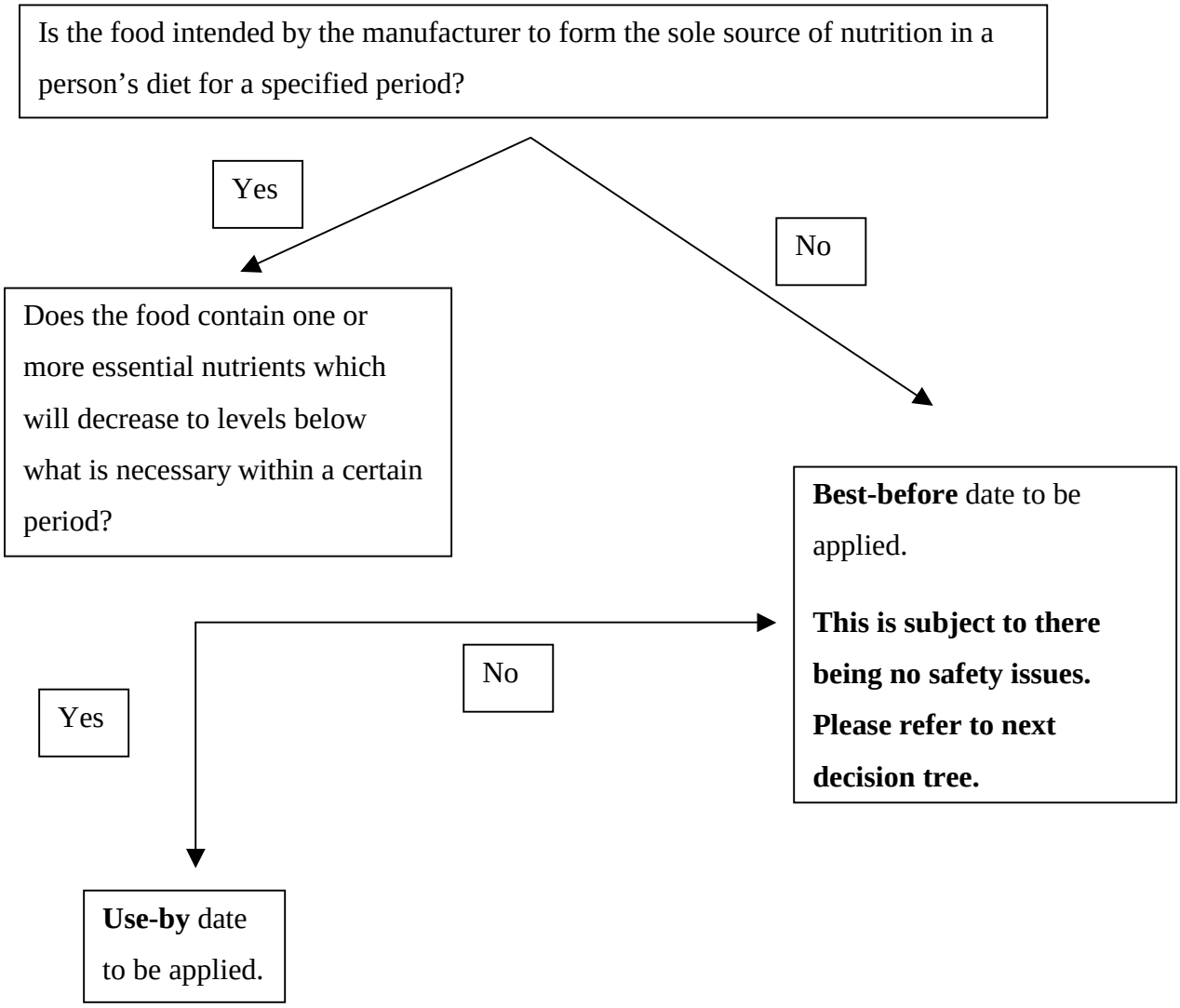
The minimum and maximum level of nutrients that some of these foods must contain may also be specified in other standards within the new Code. The manufacturer will not be able

to ensure that these special dietary foods contain the exact amount of nutrients for an indefinite period.

Foods that fit this profile must be date-marked with a ‘use-by’ date. This date will indicate the period that the food can be expected to retain all nutrients in the correct amounts, provided it is stored in accordance with any stated storage conditions.

Decision tree to determine whether a food needs a ‘use-by date’ to address health issues

The following decision tree is designed to assist manufacturers to determine whether a ‘use-by’ date needs to be applied to a food for health reasons. **Please note:** there may be rare occasions where a ‘use-by’ date is needed for health reasons that do not fall exactly within this decision tree.



Safety issues

Safety issues address concerns with food that may become microbiologically unsafe before the food visibly spoils. A food that will visibly spoil before it may pose a food safety risk is not required to be date marked with a ‘use-by’ date because it is already an offence to sell food that is damaged, deteriorated or perished. For example, it is an offence to sell food where unwanted mould is present or where the food is rancid, soured or stale. ‘Use-by’ dates do **not** apply to the following types of food.

- Shelf-stable foods such as canned foods, cereals, biscuits, soft drink, sauces, confectionery, flour and sugar—these foods either do not contain, or do not support the growth of, food poisoning bacteria.
- Food such as ice cream, frozen vegetables, frozen meals, frozen fish and frozen meat—frozen food does not support the growth of food poisoning bacteria.
- Most raw food such as meat, chicken and fish—where there is a later cooking process to kill food poisoning bacteria that may be present.

There may, however, be safety issues with certain chilled ready-to-eat foods.

A chilled ready-to-eat food is a chilled food that is ordinarily consumed in the same state as that in which it is sold and includes foods that may only undergo a mild heat treatment, such as reheating, before being consumed.

Ready-to-eat chilled foods may need to be date-marked with a ‘use-by’ date—these foods can pose a food safety risk because they will not be further processed to destroy food poisoning bacteria before being eaten. Also, some bacteria can grow to dangerous levels, even if the food is kept refrigerated, before the food noticeably spoils.

Ready-to-eat chilled foods must be date-marked with a ‘use-by’ date if the food:

- may contain food poisoning bacteria that will grow at refrigeration temperatures;
- will support the growth of food poisoning bacteria that may be present to dangerous levels before the food has noticeably spoiled; and
- will not be cooked or otherwise processed to make it safe before being eaten.

The bacteria of concern are those that will grow at refrigeration temperatures. These are:

- *Listeria monocytogenes*;
- strains of *Bacillus cereus* which will grow at refrigeration temperatures;
- strains of *Clostridium botulinum* which will grow at refrigeration temperatures; and
- *Yersinia enterocolitica.*

If you manufacture any chilled ready-to-eat food you must determine if your product could contain any of these bacteria and, if so, whether the product would support its growth.

See Attachment 1 — *Food poisoning bacteria that grow at refrigeration temperatures* for more information on these bacteria.

Decision tree to determine whether a food needs a 'use-by date' to address safety issues

The following decision tree is designed to assist manufacturers to determine whether a 'use-by' date needs to be applied to a food for safety reasons. **Please note:** there may be rare occasions where a 'use-by' date is needed for safety reasons that do not fall exactly within this decision tree.

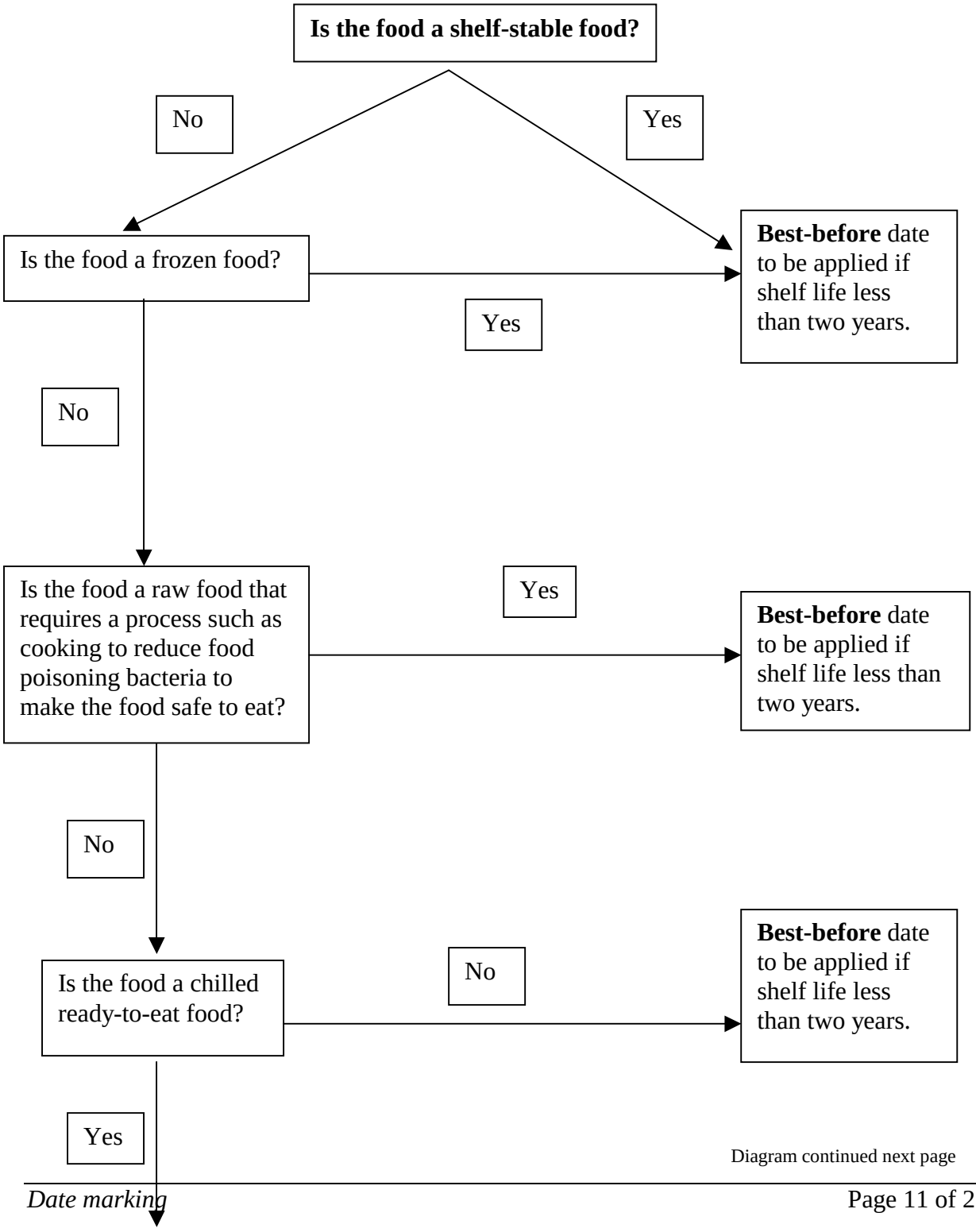
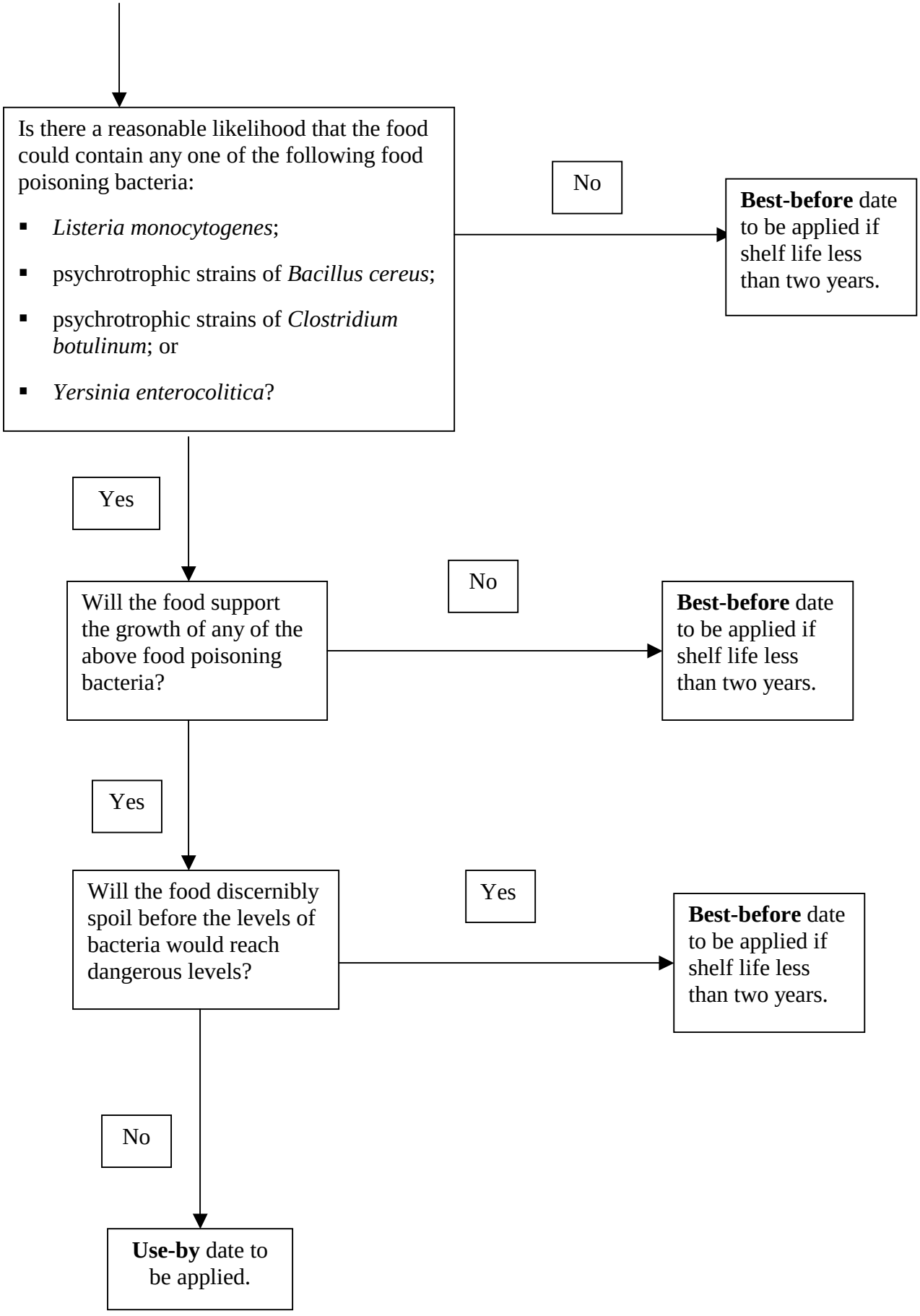


Diagram continued next page


Is there a reasonable likelihood that the food could contain any one of the following food poisoning bacteria:
▪ *Listeria monocytogenes*;
▪ psychrotrophic strains of *Bacillus cereus*;
▪ psychrotrophic strains of *Clostridium botulinum*; or
▪ *Yersinia enterocolitica*?
No
Best-before date to be applied if shelf life less than two years.
Yes
Will the food support the growth of any of the above food poisoning bacteria?
No
Best-before date to be applied if shelf life less than two years.
Yes
Will the food discernibly spoil before the levels of bacteria would reach dangerous levels?
Yes
Best-before date to be applied if shelf life less than two years.
No
Use-by date to be applied.

How do I calculate the ‘best-before’ or ‘use-by’ date?

If manufactured foods need to be date-marked with a ‘best-before’ date, the manufacturer must determine how long the food can be kept before it begins to deteriorate. This will occur when there are undesirable changes in the food such that the food is no longer marketable and consumers may no longer accept it. Undesirable changes may occur to the odour, colour, texture or flavour of the food. Food may deteriorate for the following reasons:

- spoilage bacteria and moulds;
- moisture changes in the food causing it to become too dry or too moist; or
- physical, chemical and biochemical changes which can alter flavour, colour, texture and cause loss of nutrients.

If manufactured foods need to be date-marked with a ‘use-by’ date for food safety reasons, the manufacturer will need to identify the food poisoning bacteria to be controlled and predict how long the food can be safely kept. This must take into account the storage and distribution conditions to which the food will be subjected.

If manufactured foods need to be date-marked with a ‘use-by’ date for health reasons, the manufacturer will need to identify nutrients in the food that are not stable and work out how long these nutrients are likely to be present at the correct levels in the food. This must take into account the storage and distribution conditions to which the food will be subjected.

‘Best-before’ and ‘use-by’ dates can be calculated directly by storing the food over a period of time and checking it regularly for changes. It can also be done indirectly by using accelerated storage and/or mathematical models.

Whatever method is used, ‘best-before’ and ‘use-by’ dates need to be based on realistic, not ideal, conditions.

Manufacturers may wish to seek expert advice before calculating the ‘best-before’ or ‘use-by’ date of a food. Laboratories that test food are usually able to run shelf life studies.

While the ‘best-before’ and ‘use-by’ dates only refer to the unopened package of food, manufacturers may also wish to provide advice to consumers on the shelf life and storage of a food after it is opened. This is compulsory where necessary for reasons of health or safety.

Standard 1.2.6 – Directions for Use and Storage describes specific use or storage requirements for health and safety reasons.

Where can I get more information?

For more information on the new standards call the:

Standards Information Unit
1300 652 166 (Australia)
0800 441 571 (New Zealand), or
Email: advice@anzfa.gov.au

Expert advice

You can get expert advice from:

- scientific bodies and research organisations that provide expert advice on food safety;
- teaching institutions with a food microbiology area; or
- food industry associations.

Suggested further reading

Articles

Betts GD, Gaze JE (1995) 'Growth and heat resistance of psychroptrophic *Clostridium botulinum* in relation to 'sous vide' products', *Food Control*, 6 (1): 57–63.

Notermans S, Batt CA (1998) 'A risk assessment approach for food-borne *Bacillus cereus* and its toxins', *J. Appl. Microbio. Symposium Supp.* 84: 1S–61S.

Documents

Campden & Chorleywood Food Research Association (1991) 'Evaluation of shelf life for chilled foods' *Technical Manual* No. 28 (Appendix 1 revised April 1997).

The above document can be purchased from:
Campden & Chorleywood Food Research Association
Chipping Campden

Gloucestershire
GL55 6LD UK

Phone: +44 (0) 1386 842000
Fax: +44 (0) 1386 842100
Website: www.campden.co.uk

European Chilled Food Federation (1996) *Guidelines for the Hygienic Manufacture of Chilled Foods*.

The above document can be requested from the Federation's website: www.chilledfood.org/ecff.htm

References used in compiling this guide

Betts GD, Gaze JE (1995) 'Growth and heat resistance of psychroptrophic *Clostridium botulinum* in relation to 'sous vide' products', *Food Control*, 6 (1): 57–63.

Doyle MP, Beuchat LR, Montville TJ (eds) (1997) *Food Microbiology Fundamentals and Frontiers*, ASM Press, USA.

Food Code (1999) US Public Health Service, Food and Drug Administration.

Food Science Australia (1999) *Food Safety & Hygiene*, May.

Gaze JE, Brown GD (1991) 'Determination of the heat resistance of a strain on non-proteolytic *Clostridium botulinum* Type B and a Strain of Type E, heated in cod and carrot homogenate over the temperature range 70–90°C', *Technical Memorandum No. 592*, CFDRA.

Gaze JE, Brown GD, Gaskell DE, Banks JG (1989) 'Heat resistance of *Listeria monocytogenes* in homogenates of chicken, beef steak and carrot', *Food Microbiology*, 6: 251–59.

Jay JM (1992) *Modern Food Microbiology* (4th edn), Chapman & Hall, UK.

Hocking AD (Editor in Chief) (1997) *Foodborne Micro-organisms of Public Health Significance*, AIFST (NSW Branch) Food Microbiology Group (5th edn).

Ministry of Health, New Zealand (1995) *A Guide to Calculating the Shelf Life of Foods* (1st edn).

Ray B (1996) *Fundamental Food Microbiology*, CRC Press, USA.

Roberts TA (Chairman, Editorial Committee), Baird-Parker AC, Tompkin RB (1996) *Micro-organisms in Foods 5*, Blackie Academic & Professional, UK.

Shapton DA, Shapton NF (eds) (1998) *Principles and Practices for the Safe Processing of Foods*, Woodhead Publishing Ltd, UK.

Attachment 1

Food poisoning bacteria that can grow at refrigeration temperatures

This attachment provides technical information on the food poisoning bacteria that can grow at refrigeration temperatures. Two of the scientific terms repeatedly used within this attachment , pH and water activity (a_w) are explained below to assist the reader.

pH, in the context of this document, is a measure of the acidity limits for the growth of certain food poisoning bacteria. pH is measured on a scale between 0 and 14, 0 being acid, 7 being neutral and 14 being alkaline. Most bacteria grow best at a pH near 6.8 and may also grow at pH values ranging from 4 to 8. For example, the pH of chicken is approximately 6.2 – 6.4, which allows bacteria to grow. In contrast, the pH of mayonnaise is approximately 3.6 – 4.0, which prevents most bacterial growth.

Water activity (a_w)is a measure of how much water is available to micro-organisms in a food. Water activity is measured on a scale between 0 and 1. The closer the number is to 1 the more water is available, the closer the number is to 0 the less water is available. Bacteria need moisture to grow, therefore, the less water available in a food, the harder it is for bacteria to grow. For example, confectionery normally has a water activity of 0.84 or below in contrast to fresh (unprocessed foods) which normally have a water activity above 0.99.

Listeria monocytogenes

Listeria monocytogenes can easily contaminate food as it is carried by many species of both domestic and wild animals. It is destroyed by normal cooking processes and should not be present in cooked food unless the cooking process was inadequate or the food was re-contaminated after cooking. Foods that have not undergone a process to heat the entire food to a temperature of at least 70°C for at least two minutes, or to an equivalent time and temperature, may be contaminated.

It is difficult to completely prevent cooked food from becoming re-contaminated unless it is cooked in the packaging in which it is sold or is aseptically packaged after cooking.

If a chilled ready-to-eat food may contain *Listeria monocytogenes* manufacturers need to determine whether the food will support its growth. These food poisoning bacteria are difficult to control, as they will grow down to 1°C with or without oxygen. They are also salt

and sugar tolerant. The limits for the growth of these bacteria are summarised in the following table.

Growth parameters for *Listeria monocytogenes*

Growth parameters	**Limits for growth**
Temperature	Cannot grow below 1°C
Salt concentration	Can grow up to10%
pH (acidity)	Cannot grow below pH 4.6–5.0
a_w (water activity)	Will not grow below $a_w = 0.90$, but this depends on solutes being used
Oxygen	Will grow with or without oxygen

If a food may contain and will support the growth of these bacteria, the food needs to be kept at a temperature for a time that limits the growth of the bacteria, so they does not reach dangerous levels. If temperature and time only is going to be used to control the growth of *Listeria monocytogenes*, the food will have a short shelf life. The US *Food Code* (1999) specifies the maximum time that such foods can be safely kept, depending on the storage temperature as follows:

- food kept at or below 5°C, will keep for a maximum of seven days; or
- food kept at or below 7°C, will keep for a maximum of four days.

If the food is stored at temperatures higher than 7°C, it will keep for less than four days.

The US *Food Code* times and temperatures have been included as a guide only. Manufacturers should seek expert advice for determining a safe time/temperature combination for the control of *Listeria monocytogenes.*

Strains of *Clostridium botulinum* which can grow at refrigeration temperatures

Strains of *Clostridium botulinum* that can grow at refrigeration temperatures can be present in chilled ready-to-eat foods that have been vacuum-packaged for sale. They may be present in

soil on raw foods, in raw meats and fish. These bacteria are able to form a protective coating that allows them to survive the cooking process. After cooking, the bacteria can then start growing again, if the conditions are favourable. These bacteria can only grow in the total absence of oxygen and will grow down to a temperature of 3.3°C. If they are allowed to grow to sufficient numbers, a dangerous toxin is formed.

Clostridium botulinum in chilled ready-to-eat vacuum-packaged foods is best controlled by one or more of the methods listed in the following table. A number of factors can be used to inhibit its growth. If more than one factor is used, the combination may be synergistic and require less of each factor to control growth. This is called hurdle technology.

Preferred methods for controlling strains of *Clostridium botulinum* that can grow at refrigeration temperatures in chilled, ready-to-eat, vacuum-packaged foods.

Method	**Process details**
Using a heat process that is adequate to destroy the bacteria completely	Expert advice must be sought as the heat process necessary to destroy the bacteria completely will vary according to the composition of the food
Modifying the pH (acidity) or a_w (water activity) of the food so that the bacteria cannot grow	The bacteria will not grow if: pH is 5.0 or below Salt concentration is 5.0% or more a_w is 0.97 or less
Using preservative or other food additives that inhibit growth	Nitrite or a combination of nitrite and sorbic acid are the common preservatives used

If manufacturers are not using one or more of the above methods, then temperature alone or a combination of time and temperature must be used to prevent the bacteria growing to dangerous levels. These methods are not recommended, as they are unlikely to be as effective due to the difficulty of ensuring that the temperature of the food is maintained correctly. For

example, if temperature alone is used, the food must be maintained at below 3.3°C until it is consumed. This is impossible if the food is being sold to the public.

If a combination of time and temperature is used, manufacturers must date mark the product with a 'use-by' date to indicate the period during which it can be safely consumed, if stored at or below the temperature indicated. The temperature must be achievable by retailers and consumers. The manufacturer is responsible for determining a safe time/temperature combination and should seek expert advice. Note that the organism can produce toxins within 31 days at 3.3°C and within 12 days at 8.0°C in the absence of any other hurdle.

Strains of *Bacillus cereus* which can grow at refrigeration temperatures

Strains of *Bacillus cereus* that can grow at refrigeration temperatures can be found in soil and water and is a common contaminant of plant foods, particularly cereals and spices. They may also be present in raw milk.

Normal cooking processes, as well as pasteurisation, destroy the vegetative (or growing) form of these food poisoning bacteria. However, these bacteria are able to form a protective coating that allows them to survive the cooking process. After cooking, the bacteria can then start growing again, if the conditions are favourable.

The following table specifies the limits for growth of this bacteria.

Growth parameters	**Limits for growth**
Temperature	Cannot grow below 4–5°C
Salt concentration	Cannot grow above 7% at pH 6–7 and 30–35°C
pH (acidity)	Cannot grow below 4.3 at 30–35°C
a_w (water activity)	Cannot grow below 0.91
Oxygen	Can grow in the absence of oxygen and may also be able to grow in reduced oxygen conditions

It is difficult to completely destroy these bacteria using heat, as higher temperatures are needed to destroy it than are required to destroy *Clostridium botulinum*. It is also not known

what temperatures and times are needed to reduce it to safe levels. Therefore, if manufacturers wish to use a heat process they need to seek expert advice.

If a heat process is not used to destroy strains of *Bacillus cereus* that can grow at refrigeration temperatures, other control methods must be used, such as:

- creating conditions that do not allow the bacteria to grow (see table above for growth limits);
- using a preservative such as nisin, benzoate or sorbate to inhibit growth;
- using a combination of time and temperature control to ensure that the food is consumed before the bacteria can reach dangerous levels; or
- using a combination of the above factors.

If time and temperature alone is used, or in combination with a number of other factors, to ensure the microbiological safety of the food, the product will need to be date-marked with a 'use-by' date. The 'use-by' date would indicate the period during which the product can be safely consumed if stored at or below the temperature indicated. The temperature must be achievable by retailers and consumers. The manufacturer is responsible for determining a safe time/temperature combination and should seek expert advice on this.

Yersinia enterocolitica

This food poisoning bacteria has been found in many different mammalian species, as well as in birds, frogs, fish, flies, crabs and oysters. It is also commonly found in soil, vegetation, lakes, rivers and wells. Foods that may harbour it include pork, beef, lamb, poultry and dairy products, particularly milk, cream and ice cream. However, pigs are believed to be the principal reservoir of strains dangerous to humans.

The bacterium is relatively sensitive to heat and should be destroyed by processes used to destroy other food poisoning bacteria. It is also rapidly destroyed by pasteurisation. It should not be present, therefore, in cooked or pasteurised foods unless these foods are contaminated after the heat process has occurred. Unlike *Clostridium botulinum* and *Bacillus cereus*, it does not form a heat resistant protective coating.

The growth parameters for this food poisoning bacteria are summarised in the following table.

Growth parameters	**Limits for growth**
Temperature	Will grow from –1.3°C to 42°C
Salt concentration	Growth at 5%, no growth at 7%
pH (acidity)	Will not grow below pH 4.2
Oxygen	Can grow with or without oxygen.