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# *Listeria* Management Program

NSW/FA/FI034/0809

## Contents

## 1. Introduction

*Listeria* is a common bacteria found in the food processing environment, particularly in the manufacture and packaging of ready-to-eat (RTE) meats and smallgoods.

In 2008 the Meat Standards Committee published *Guidelines 3-2008: Regulatory guidelines for the control of Listeria*. The aim of the guidelines is to control the occurrence of *Listeria* in RTE meats via environmental and product testing.

Environmental and product sampling plays a large role in identifying potential trouble areas in a food processing facility and revealing conditions that may contribute to final product contamination. Regular monitoring of the environment in and around the RTE meat handling area can be an effective early warning system for identifying potential sources of *Listeria* contamination in finished product.

These guidelines are targeted at butchers and meat processors who pack and sell RTE meats using a method that prolongs or extented the shelf life of the product.

This booklet had been developed by the NSW Food Authority to help butchers and meat processors understand the details of the guidelines and provide information and example forms that may help butchers to comply with the guidelines.

Further information can be obtained by contacting the NSW Food Authority on 1300 552 406 or at contact@foodauthority.nsw.gov.au

## 2. General Circular 4/2008

This general circular contains important information from the NSW Food Authority for meat processors and retail meat licensees.

Please take the time to read this information.

If you have any queries, please contact:

Consumer and Industry Helpline on 1300 552 406, or email contact@foodauthority.nsw.gov.au

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General Circular 04/2008

**To:** **All meat processors and retail meat licensees**

**Subject:** **Regulatory guidelines for the control of *Listeria***

## Purpose

The purpose of this circular is to advise meat processors and meat retailers on changes in requirements for meat businesses where packaged ready-to-eat (RTE) meat products are being produced on their premises. The requirements apply to all licensed meat businesses that manufacture packaged RTE meats for sale, including those businesses that purchase manufactured RTE meat products for slicing and packaging for further sale.

The FSANZ Food Standards Code prescribes mandatory requirements for the manufacture of packaged RTE products. The Code also prescribes microbiological limits for *Listeria monocytogenes* in specific products such as cooked and cured/salted meat, packaged heat treated meat paste and packaged heat treated pâté.

**This circular only applies to meat products which are packaged (eg vacuum pack, modified atmosphere packaging) RTE. It does not apply to unpackaged products or products which are to be cooked prior to consumption, such as bacon.**

Compliance with the FSANZ Food Standards Code is a condition of the licence issued by the NSW Food Authority to operate a meat business.

## Background

*Listeria monocytogenes* has been recognised as a major cause of foodborne disease over the past twenty years. There have been several RTE meat-related listeriosis outbreaks in Australia, and *L. monocytogenes* has caused some significant problems for the Australian meat industry. The presence of *L. monocytogenes* in RTE meat products has lead to product recalls, destruction of contaminated product, short term plant closures and extensive clean up procedures. These incidents can cause substantial losses for the businesses involved and can result in a loss of consumer confidence in the safety of meat products.

To ensure consistent application of the Food Standards Code in all states and territories, the Meat Standards Committee of the Primary Industries Ministerial Council of Australia has developed guidelines (see page 6) to be implemented by any business handling or intending to handle this type of product.

This document has been developed to assist the meat industry in the control of *Listeria* organisms in the RTE meat processing environment. Additionally it sets out the procedures to be adopted for the monitoring of *Listeria* as well as the activities to be followed if *L. monocytogenes* is detected in meat products or the environment.

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**Present position**

The guidelines attached provide information on the minimum sampling plan requirements. Note these requirements relate to product intended for either retail or wholesale purposes.

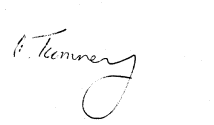
Applicable meat businesses must review their food safety program to ensure that the control measures and sampling plan for *Listeria* contained within the guidelines are implemented and documented in their food safety program by **1 October 2008**. This will be assessed during audits conducted by the NSW Food Authority after this date and non-compliance to these requirements may result in an audit failure, which could lead to further enforcement action being undertaken by the Authority.

If your company has implemented a sampling plan which you believe is equivalent to the sampling plan attached, you may submit it to the NSW Food Authority for approval.

**Enquiries**

If you have any queries, please contact:

**Consumer and Industry Helpline** on 1300 552 406, or email contact@foodauthority.nsw.gov.au



Christine Tumney

**A/Executive Director**

**Compliance, Investigation and Enforcement Branch**

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## 3. Meat Standards Committee Guidelines

| | |
|---|---|
| **Title** | Regulatory guidelines for the control of *Listeria* |
| **Reference No.** | MSC – 03/2008 |
| **Date approved** | 20 February 2008 |
| **Date of expiry** | Until further notice |
| **Date of review** | 20 February 2009 |
| **To be read in conjunction with** | AS 4696:2007 and the *Australia New Zealand Food Standards Code* |
| **Previous guideline** | Not applicable |

| | | | |
|---|---|---|---|
| **Distribution** | Meat Standards Committee (MSC) | | ✓ |
| | Primary Production and Processing Working Group (PPPWG) | | ✓ |
| | Food Standards Australia New Zealand (FSANZ) | | ✓ |
| | **Controlling authorities** | | |
| | ACT | ACT Health | ✓ |
| | NSW | NSW Food Authority | ✓ |
| | NT | Department of Primary Industry, Fisheries and Mines | ✓ |
| | QLD | Safe Food Production Queensland | ✓ |
| | SA | Primary Industries and Resources South Australia | ✓ |
| | | South Australian Meat Hygiene Advisory Council | ✓ |
| | TAS | Department of Primary Industries, Water and Environment | ✓ |
| | VIC | PrimeSafe | ✓ |
| | WA | Department of Health | ✓ |
| | | West Australian Meat Industry Authority | ✓ |
| | Federal | Australian Quarantine and Inspection Service | ✓ |
| | **Industry organisations** | | |
| | Australian Game Meat Producers Association | | ✓ |
| | Australian Meat Industry Council | | ✓ |
| | Australian Poultry Industries Association | | ✓ |
| | Australian Pork Limited | | ✓ |
| | Australian Renderers' Association | | ✓ |
| | Meat & Livestock Australia | | ✓ |

## Glossary

| | |
|---|---|
| Applicable meat business | A meat business that manufactures packaged ready-to-eat (RTE) meats for sale, as identified in Standard 4.2.3 of the Australia New Zealand Food Standards Code (the Code) or a meat business that purchases manufactured RTE meat products for slicing and packaging for further sale. |
| Batch | Up to 24 hours of continuous production of product or products from any specific line or a lesser period of continuous production between cleaning and sanitising procedures having been completed. |
| Controlling authority | When used in relation to the production of meat or meat products, means the Commonwealth, state or territory authority that is responsible for the enforcement of legislation as it applies to the meat or meat products. |

## Purpose

Meat businesses are obliged to manage food safety hazards and validate their processes for manufacturing packaged ready-to-eat (RTE) meats. This document provides guidance for controlling authorities to enable consistent management of that validation process and outline a minimum standard for managing the *Listeria* hazard in these businesses.

## Scope

This document applies to all meat businesses that manufacture packaged RTE meats for sale, as identified in Standard 4.2.3 of the Australia New Zealand Food Standards Code (the Code). It also applies to meat businesses that purchase manufactured RTE meat products for slicing and packaging for further sale. Such businesses shall be referred to as *applicable meat businesses*.

A RTE meat or poultry product is defined as one that is in a form that is edible without additional preparation to achieve food safety. The product may or may not receive additional preparation before consumption (eg reheating) to improve its taste or appearance. Where there is doubt over whether a product is RTE (eg frozen or flash-fried product), products will not be considered RTE if the product label prominently indicates the need to cook the product for safety and the cooking instructions have been validated by the applicable meat business.

Businesses that apply a post-cooking lethality treatment to product (eg in-pack pasteurisation) do not fall within the scope of this document, but are still required to validate their process.

## Responsibilities of processors

Meat processors whose operations fall within the scope of this document shall develop quality assurance procedures approved by the controlling authority. These must address the following parameters:

### *Minimum operational requirements*

Applicable meat businesses must review how their operations comply with Section 2 of the Meat & Livestock Australia (MLA) document, *Listeria monocytogenes in smallgoods: risks and controls*, and implement these requirements within their quality system. Controlling authorities shall use this document as a basic reference tool to assess compliance with Standard 4.2.3 of the Code in order to validate the meat business' process control.

### *Minimum environmental sampling plan*

Each applicable meat business shall implement an effective *Listeria* sampling plan that covers environmental testing and shall be able to justify its sampling methodology for detecting

*Listeria* spp. in the processing environment. The objective of the sampling plan is to assess whether the RTE environment is adequately under control with respect to potential contamination of RTE product with *L. monocytogenes*. The company's food safety program must include the frequency of testing, identify the size and location of the sample sites, and detail corrective action procedures including cleaning programs and handling of product following a positive test for *Listeria* indicator organisms on a food contact surface.

Applicable meat businesses shall sample sites within the operating environment that are most likely to reveal contamination by *Listeria* if it is present. The choice of sites must be justified and documented in the food safety program. Table 1 lists sites where *L. monocytogenes* is likely to establish and multiply. Zone 1 sites are those that are typically contaminated with *L. monocytogenes* contamination while Zone 2 sites are those that can harbour *Listeria* organisms in a RTE processing environment. Samples shall be taken from Zone 1 and Zone 2 surfaces.

**Table 1. Classification of environmental sampling sites as part of a *Listeria* sampling plan**

| Priority | Examples of sampling sites within the priority zones |
|---|---|
| Zone 1 | Equipment that comes into contact with cooked product (eg slicers, dicers, hoppers), spiral freezers and conveyors for cooked product, tables and benches on which product is stored or portioned. |
| Zone 2 | Floors, walls, ceilings, drain outlets, pools of water (eg on the floors of a manufacturing area or cold room), condensate from refrigeration evaporators (cold rooms), chiller doors, switches, floor joints/crevices |

At a minimum, applicable meat businesses shall sample five environmental sites for *Listeria* spp. monthly. Testing shall include samples collected before operations commence and during operations, and shall cover all important work surfaces over time. Businesses shall maintain a consistently high level of hygiene and shall undertake sampling throughout the year regardless of whether the applicable business is producing packaged RTE product in a particular month.

Product testing complemented by environmental testing to monitor and detect *Listeria* in the environment is more effective than product testing alone. Two factors determine the effectiveness of a *Listeria* control program – the design of the environmental testing plan (ie the capacity to find *Listeria* if present) and the response to a positive finding (ie what corrective action is implemented).

Controlling authorities acknowledge a *Listeria*-free environment is difficult to maintain at every test. The microbiological sampling plan shall be designed to detect *Listeria* if it is present, and it would be unusual if *Listeria* wasn't found in the environment occasionally. However, any detection of *Listeria* must be treated as an opportunity to improve the program, a strategy that will ultimately protect both consumers and the business.

### *Action in the event of a positive environmental sample – Zones 1 and 2*

If a positive environmental sample is found, the applicable meat business shall immediately investigate the potential cause of the problem and initiate corrective action in accordance with its food safety program. The suspect areas shall be immediately identified, cleaned and sanitised. Any implicated equipment and parts shall be dismantled and cleaned effectively, for example, by soaking in a concentrated sanitiser (eg Quat) at 800 or 1000 ppm. The business shall ensure RTE product is not contaminated and continue to review corrective action. This process allows the business to demonstrate adequate steps have been taken to minimise the risk of *Listeria* contamination of RTE product.

Whenever there is a positive environmental sample for *Listeria* from either a Zone 1 or Zone 2 surface, the business shall increase the frequency of environmental testing to weekly and continue to test until the environmental swabbing program has achieved three consecutive weeks of negative results. The purpose of increasing the testing frequency is to monitor the effectiveness of the corrective action that has been undertaken by the meat business. Where negative results are not being obtained, the adequacy of the corrective action needs to be further reviewed and revised corrective action shall be implemented.

### *Additional action in the event of a positive environmental sample – Zone 1*

To ensure end product has not been contaminated, where a food contact surface tests positive for *Listeria* that swab shall be typed in a laboratory to confirm the presence or otherwise of *L. monocytogenes*. All potentially contaminated RTE product shall be held pending the results of this test. If the presence of *L. monocytogenes* is confirmed, the applicable meat business shall follow Standard 1.6.1 of the Code and test and hold available product batches from the day of the first positive *L. monocytogenes* environmental contamination onwards. Product batches shall be tested for *L. monocytogenes* at the rate of five 25-gram samples per batch. Composite testing is permitted at the laboratory. The business shall continue to test each production batch until the environmental swabbing program has achieved three consecutive negative results

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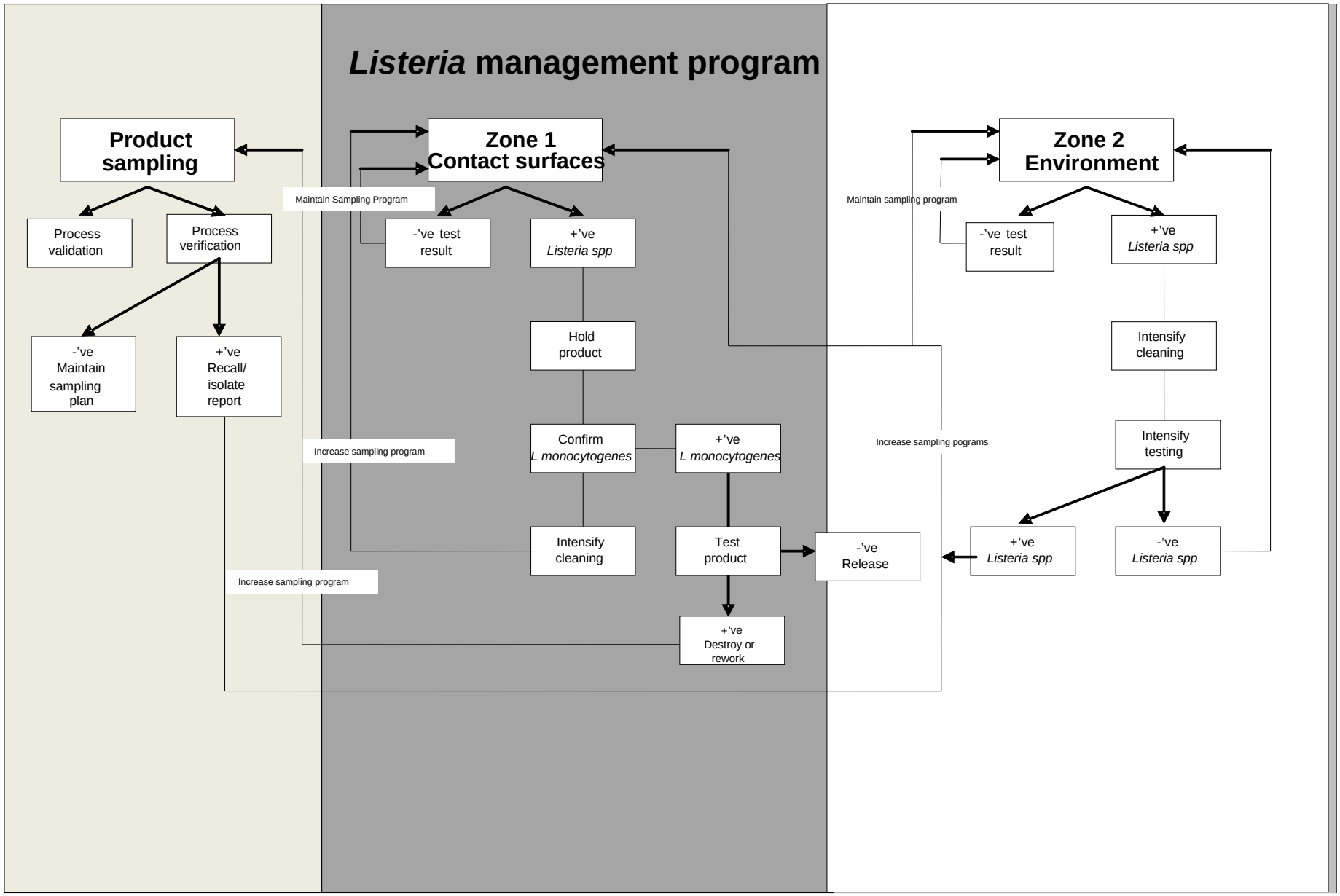

### Minimum product sampling plan

Applicable meat businesses shall conduct microbiological testing of finished product to verify good manufacturing practice (ie hygiene and sanitation processes) and compliance with the product safety requirements of the Code. Results shall be recorded and used to improve food safety practices. The testing program shall be documented in the applicable meat business' food safety program and include the frequency of testing, the product type and batches to be tested, and corrective action procedures (including handling of affected batches) should there be a positive test for *L. monocytogenes*. Any product recall shall comply with the provisions of the Code. The food safety program shall contain documented procedures for product recall. Product testing shall be conducted in a NATA-accredited laboratory using AS 1766.2.16.1-1998 as the reference test method.

Applicable meat businesses shall sample RTE finished product for *L. monocytogenes* at an initial rate of at least one sample per fortnight for the first three months of initial production of RTE packaged product. Where no positive product test results are recorded during that time the applicable meat business can commence sampling at a rate of once every three months. Where various types of RTE finished product undergo the same process post-cooking only one sample of product needs to be submitted for analysis. However, where the business produces RTE finished product on various production lines or the process varies post-cook for different product types, a sample of each of product type shall be submitted.

If *L. monocytogenes* is detected in an RTE product the applicable meat business shall notify the controlling authority within 24 hours of receiving the result and begin a clearance program to ensure product complies with the provisions of the Code. A clearance program of test and hold of each batch should be implemented until acceptable results are obtained for three consecutive batches of the affected type of product. Sampling of potentially affected product shall adhere to the sampling plan stipulated in Standard 1.6.1 of the Code, which requires product batches to be tested for *L. monocytogenes* at five 25-gram samples per batch. Composite testing of these product samples is permitted at the laboratory.

Where product has been contaminated with *L. monocytogenes* the controlling authority would expect the applicable meat business to undertake a thorough review of its *Listeria* control program to determine the source of product contamination. Such a review may require a business to increase the frequency of its environmental testing program until the clearance program is completed. Following completion of the clearance program, the applicable meat business shall revert back to the fortnightly product sampling regime as described above, and if results are acceptable, progress to the three-monthly product testing frequency.

For the purpose of these guidelines, a batch is defined as up to 24 hours of continuous production of a product or products from any specific line or a lesser period of continuous production between cleaning and sanitising procedures having been completed.

### Controlling authorities

A controlling authority shall apply these guidelines unless it has expressly approved another testing regime.

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## Appendix A

Assistance material for meat businesses.

### Testing at NATA-accredited laboratories

Controlling authorities require all **product testing** for the presence of pathogens (ie bacteria that may cause illness) to be conducted at a NATA-accredited laboratory. Product and food contact surface samples must be tested using approved laboratory test methods. Businesses can obtain a list of NATA-accredited laboratories that conduct microbiological testing of meat and meat products at www.nata.com.au.

### Test methods

There has been significant progress in the development of *Listeria* spp. isolation techniques, including rapid, sensitive and specific methods that reduce detection time. The required reference method is *AS 1766.2.16.1 – 1998: Food microbiology – Examination for specific organisms - Food and animal feeding stuffs - Horizontal method for the detection and enumeration of Listeria monocytogenes – Detection method*. This standard provides a reference method suitable for determining whether meat products comply with microbiological requirements. Other approved test methods are referenced at the end of these guidelines.

### Equipment for environmental sampling

Food contact surfaces are tested to check the effectiveness of clean-down and to assess whether *Listeria* spp*.* are present in post-cook areas and packing rooms. While several methods of sampling and testing are available, it is recommended a standard testing process be used to enable valid comparisons of results over time.

The aim in sampling contact surfaces is to extract as many bacteria as possible; hence it is important to use absorptive materials such as sponges or swabs, which are commercially available in sterile packs. The location of the sampling site determines which absorptive material should be used.

### Sponge sampling

Use sponges to sample tables, floors, door handles, seals on chiller doors, conveyors, air conditioning units and drip trays, and any other flat surfaces. If the surface is dry the sponge can be moistened with sterile peptone water. If the surface is already wet, such as a drip tray or a conveyor, it is best to rehydrate the sponge using the moisture on the surface being tested. Sponges can also be used on slicers, dicers, packing machines and other processing equipment.

Sponges allow large areas to be sampled with up to $5m^2$ of contact surface able to sampled if both sides of the sponge are used. Sponges can be rubbed quite vigorously over surfaces to remove particles of dust and organic material containing bacteria.

Sponge samples can be used for up to five different surfaces to maximise the number of surfaces tested in order to minimise costs. However, where samples have been composited and a positive result is returned, each site will subsequently need to be tested individually to ascertain where the organism came from.

### Swab sampling

Swabs are used for sampling inside plant and equipment, eg fins on cooling units, motor housings, bearings on conveyors and inside hollow rollers. Swabs are not as absorptive as sponges and get overloaded if used to sample more than 100cm$^2$. Swabs should be used carefully so as not to break them by rubbing too hard.

### Rapid test kits

There are a number of test kits containing sponges and swabs available for in-house testing, but irrespective of which one is used, it is important to read and understand all the instructions pertaining to the testing procedure, storage and transport of samples. Rapid test kits are only useful as a screening method. Any positive *Listeria* spp. test results must be confirmed using the reference test method at a laboratory.

Only rapid microbiological kits that have been approved by independent bodies such as The Association of Official Analytical Chemists (AOAC) shall be used. Businesses that do not use a laboratory must validate their test kits when testing commences and every twelve months thereafter by submitting comparative samples to a laboratory.

Most small to medium size businesses would only need the following material to take environmental samples:

- Sterile sponges (preferably pre-moistened)
- *Listeria* spp. swabs
- A medium such as a neutralising broth that contains agents to neutralise sanitiser (10ml bottles should suffice).

The above items are available from distributors of microbiological testing equipment.

### Procedure for *Listeria* spp. environmental sampling[1]

#### *Environmental sampling*

Environmental swabs can be taken from Zone 1 or Zone 2 areas within the plant and can be taken over any size area with any suitable implement as long as the implement is sterile and clean. Suitable swabbing implements include cotton buds, eye patches and gauze squares. The surface area swabbed will vary according to the size of the area to be examined.

The area to be swabbed should not contain any chemical residues that may inhibit or interfere with the growth of *Listeria* spp. If the presence of chemical residues is suspected, the sampling should either be aborted or the sample should be submitted along with a note outlining the suspected presence of residues.

Locations in the processing area most prone to contamination by *Listeria* spp. shall be identified and procedures subsequently implemented to control the occurrence and spread of *Listeria* spp.

### Swabbing techniques

a) Wherever possible swabs should be taken during full production or before equipment clean-up. Swabs must not be taken immediately after equipment has been cleaned as residues of detergents and sanitisers will reduce the viability of any *Listeria* present. If samples must be taken during non-production, wait for several hours after cleaning or sanitising.

[1] Reproduced from ADASC – 1999 – Australian Manual for Control of Listeria in the Dairy Industry

b) Use one jar of nutrient broth or 0.1% peptone per sampling. Open the broth jar and place lid, face up, on a **clean** bench.

c) Remove the swab from its tube and lightly touch the end of the swab to the surface of the solution. Do **not** immerse the swab completely in the solution.

d) Rub the swab slowly over/in the surface to be sampled. A surface area of up to 50cm$^2$ can be swabbed.

e) Return the swab to the transport medium container.

f) Use one jar of broth per sampling. Once you have taken all swabs needed discard the broth. **Do not re-use.**

g) All swabs should be held at 4°C during transportation.

For gauze swabs follow this procedure:

a) Sterile gauze can be used to swab large surface areas.

b) Aseptically open the individually wrapped gauze pads. Open a vial of rinse solution and moisten a pad with 10ml of solution.

c) Holding the pad aseptically with sterile gloves, swab the surface by vigorous rubbing. An area of several square metres can be effectively swabbed.

d) After sampling, aseptically place the swab into a sterile container for transport.

e) All swabs should be held at 4°C during transportation.

To swab correctly wipe the swab in a zig zag motion across the surface area. The zig zags should be close together to cover as much of the surface area as possible, as illustrated below. If using a cotton bud for a swab, the bud should be rotated as it is wiped across the area. Once the swab has been drawn over the surface area once, re-swab at a 90° angle to the original swab and place the cotton bud in the transport vessel.

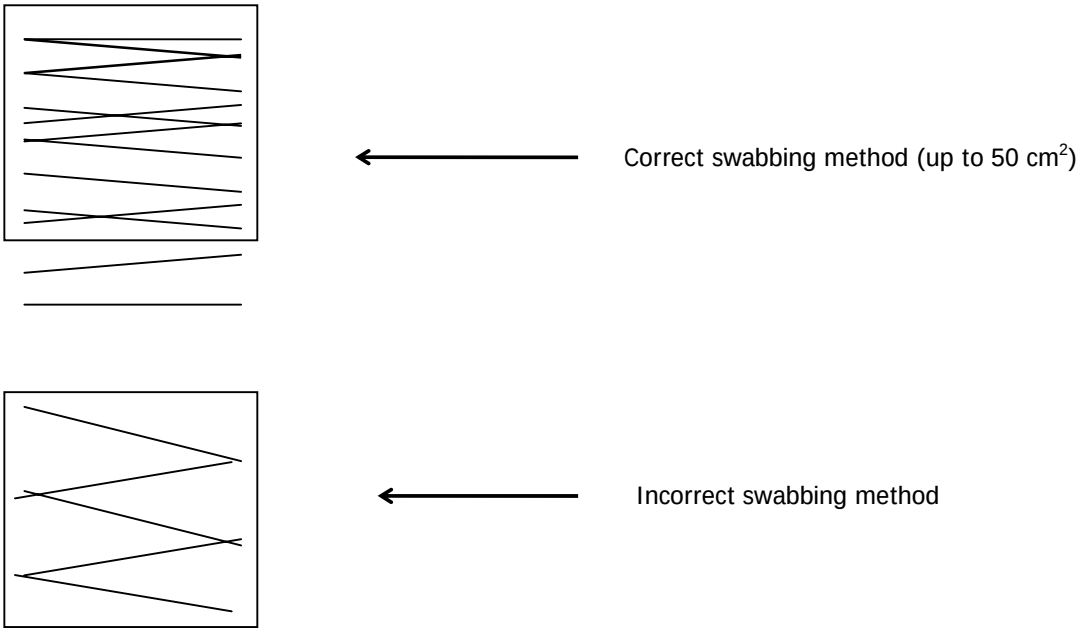


**Figure 1. Correct and incorrect swabbing techniques**

**Sampling methods for the microbiological analysis of cooked foods**

- Samples shall be taken of finished product. Wherever possible, product sampled should be in the form that it is sold to the consumer (eg final packaged product should be sampled for product that is sold sliced and pre-packaged).
- An RTE product that has been cooked, chilled to below 5°C (not frozen) and preferably vacuum packed shall be randomly selected.
- The package should not be opened or damaged and shall be delivered or sent by courier in a small esky or equivalent with ice or similar to ensure the product can be maintained at 5°C or below to a NATA-accredited laboratory for analysis **within 48 hours** of manufacture or final packaging.
- Complete a laboratory submission form detailing what type of analysis you require (eg *L. monocytogenes* testing) and include a batch number or lot identification for each individual product on the submission form, and on the product packaging. For complete traceability, this identification must also relate to batch information on the cooking monitoring sheet.

**Records**

- File all laboratory results with the monitoring documentation and keep these on the premises for audit purposes.

**Approved testing methods for microbiological testing of meat products**

- Australian Standard AS 1766.2.16.1-1998: Food microbiology – Examination for specific organisms – Food and animal feeding stuffs – Horizontal method for the detection and enumeration of *Listeria monocytogenes* - Detection method
- FSIS MLG 8.04 – Isolation and identification of *Listeria monocytogenes* from red meat, poultry, egg, and environmental samples
- Rapid methods – Where positive confirmation is required such confirmation must be by Australian Standard 1766.2.16.1-1998 or FSIS MLG 8.04
- FSIS MLG 8A.01 – FSIS procedure for the use of *Listeria monocytogenes* BAX screening test
- FDA BAM – Chapter 10 (January 2003) Detection and Enumeration of *Listeria monocytogenes* in Foods
- AOAC 995.22 – TECRA *Listeria* VIA
- AOAC 996.14 – BioControl Assurance
- AOAC 997.03 – BioControl VP
- AOAC 999.06 – VIDAS LIS (AOAC 2004.06 - VIDAS LIS modification)
- AOAC 2002.09 – TECRA *Listeria* VIA
- *Listeria monocytogenes* BAX (performed as per manufacturers' instructions)

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## 4. Frequently asked questions (FAQs)

*Listeria circular for packaged RTE meats*

**Why do I have to test my packaged product?**

Because *Listeria* has been identified as a problem bacteria in vacuum packaged ready-to-eat (RTE) products as it:

- can survive and grow without oxygen,
- can survive and grow at refrigeration temperatures, and
- is a common bacteria in the meat processing environment

**Who has to test?**

Any licensed retail meat premises (RMP) and meat processor (MP) that is producing vacuum pack or modified atmosphere packaged RTE products

**Who does *not* have to test?**

Any RMP or MP that:

- packages RTE product in front of the customer using cling wrap, plastic bags etc,
- is not packaging RTE meats eg raw meat,
- is packaging processed meats that are not RTE eg bacon, frankfurts, kransky etc, (noting advice in guidelines relating to labelling stating whether product requires cooking etc),
- stores or sell packaged RTE product that is packaged by someone else, as well as
- premises that 'cook in bag' and do not engage in repackaging of the product (sold as a whole piece)

**If I do use vacuum packaging or modified atmosphere packaging, is there any alternative to testing as per the guidelines?**

- The only alternative to testing as per the guidelines is to post-pasteurise after packaging:
    - Not suitable for sliced product
    - Refer to *Listeria* Management Program booklet
    - Product must be fully sealed prior to immersion
    - Product must be fully immersed in water which is to be at a prescribed minimum temperature, for a prescribed time
    - Equipment must be able to provide a constant temperature of water throughout the vessel used to post pasteurise eg similar to a batch pasteuriser used in the dairy industry
    - Approval required from the NSW Food Authority to use this method
    - Verify the process by conducting product testing

**What if I am only packaging once a week/once a month/at Christmas etc?**

You still have to do the testing.

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**What exactly do I need to do?**

- Get a test kit to swab your facilities environment
    - Swab at least five sites per month from Zone 1 and Zone 2 area for *Listeria* species
- Test your finished products
    - All **product** sampling is to be conducted at a NATA accredited laboratory (www.nata.asn.au)
    - One sample per fortnight for the first three months
    - If no positive results are found in the first three months, testing can then go to once every three months

**What do I do if I get a positive result?**

*Positive swabs*

- Zone 1 positive result:
    - Put product on hold
    - Send swab to NATA lab to confirm if *L. monocytogenes*
    - Conduct an intensive cleaning of all product contact surfaces
    - If swab is positive for *L. monocytogenes*, test product on hold
- Zone 2 positive result:
    - Send swab to NATA lab to confirm if *L. monocytogenes*
    - Conduct an intensive cleaning of all product contact surfaces
    - If swab is positive *for L. monocytogenes*, increase the number of swabs of Zone 1 areas

*Positive product*

- Notify NSW Food Authority within 24 hours of receipt of result
- Isolate any product still at your facility, recall any product that has left the facility

**Who to contact for further assistance**

The NSW Food Authority on 1300 552 406 or at contact@foodauthority.nsw.gov.au

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## 5. Use of in-pack pasteurisation as a way of reducing the risk of *Listeria* contamination on RTE meats

The *Regulatory guidelines for the control of Listeria* requires businesses manufacturing packaged ready-to-eat (RTE) meats for sale to do swabbing of the processing environment and test finished product for the presence of *Listeria monocytogenes*.

However, businesses that apply a post-cooking lethality treatment to the product, such as in-pack pasteurisation, may be exempted from some of the testing requirements. Applying heat, such as immersing packaged cooked meat in hot water can destroy any *Listeria* that may have contaminated the product.

**Possible disadvantages to in-pack pasteurisation:**

- Heating might change the meat (colour, texture, excess fluid etc), making it unattractive to consumers
- Process is not simple for many businesses to do and is time consuming
- It can be difficult to heat all surfaces of the meat evenly (might get hot spots and cold spots)
- It is not suitable for sliced packaged product
- Might adversely affect packaging (not all packaging can withstand high temperatures)
- Heating for too long might begin to heat the core of the product (which will make it difficult to cool)

While in-pack pasteurisation can provide a very effective control measure for *Listeria,* the most difficult part is to find the time and temperature that will kill the *Listeria* without changing the look and taste of the packaged product. There are lots of variables which can affect the rate of heating and how effective the process is (see Table 1) which is why the NSW Food Authority advises that in-pack pasteurisation is only suitable for packaged whole primal pieces such as hams, silversides etc where only the surface has to be heated to destroy *Listeria*.

**Table 1. Possible sources of variation for in-pack pasteurisation**

| | |
|---|---|
| Product shape | The size, shape and thickness of the product will affect the evenness of heating, as will overlapping or touching products, which could create cold spots where the heat will take longer to penetrate |
| Product surface | Meat coated with spices, skin on poultry could take longer to heat |
| Product composition | Injected/pumped/pickled products or presence of nitrite |
| Packaging | The type of packaging (film composition and thickness) |
| Type of meat | Lean vs fat; beef vs poultry |
| Hot water tank | Capacity and ability to heat and hold temperature |

The goal of pasteurisation is to heat the surface of the meat to at least 72°C. Businesses are encouraged to get expert help and must validate any process they intend to use.

Table 2 shows the times and temperatures required to give a 6D reduction in *Listeria* on the surface of RTE meats. The temperature of the water will need to be hotter than this, and there will be variation between different meat products.

**Table 2. Process times and temperature to deliver a 6D reduction of *Listeria monocytogenes***

| Meat surface temperature (°C) | Immersion time (minutes) |
|---|---|
| 60 | 44 |
| 61 | 33 |
| 62 | 24 |
| 63 | 18 |
| 64 | 13 |
| 65 | 10 |
| 66 | 7 |
| 67 | 6 |
| 68 | 4 |
| 69 | 3 |
| 70 – 72 | 2 |
| 73 – 75 | 1 |
| 76 or hotter | <1 |

A 6D process reduces the number of bacteria from 1,000,000 to one.

An indication of the meat's surface temperature can be measured using an infra red thermometer (eg Raytek) immediately after removing from the hot water or by measuring the water temperature to ensure the time/temperature parameters in Table 2 are met.

Once heated, the product must also be chilled quickly (eg by immersion in iced water or blast freezing straight after heating), as this also helps to destroy *Listeria.*

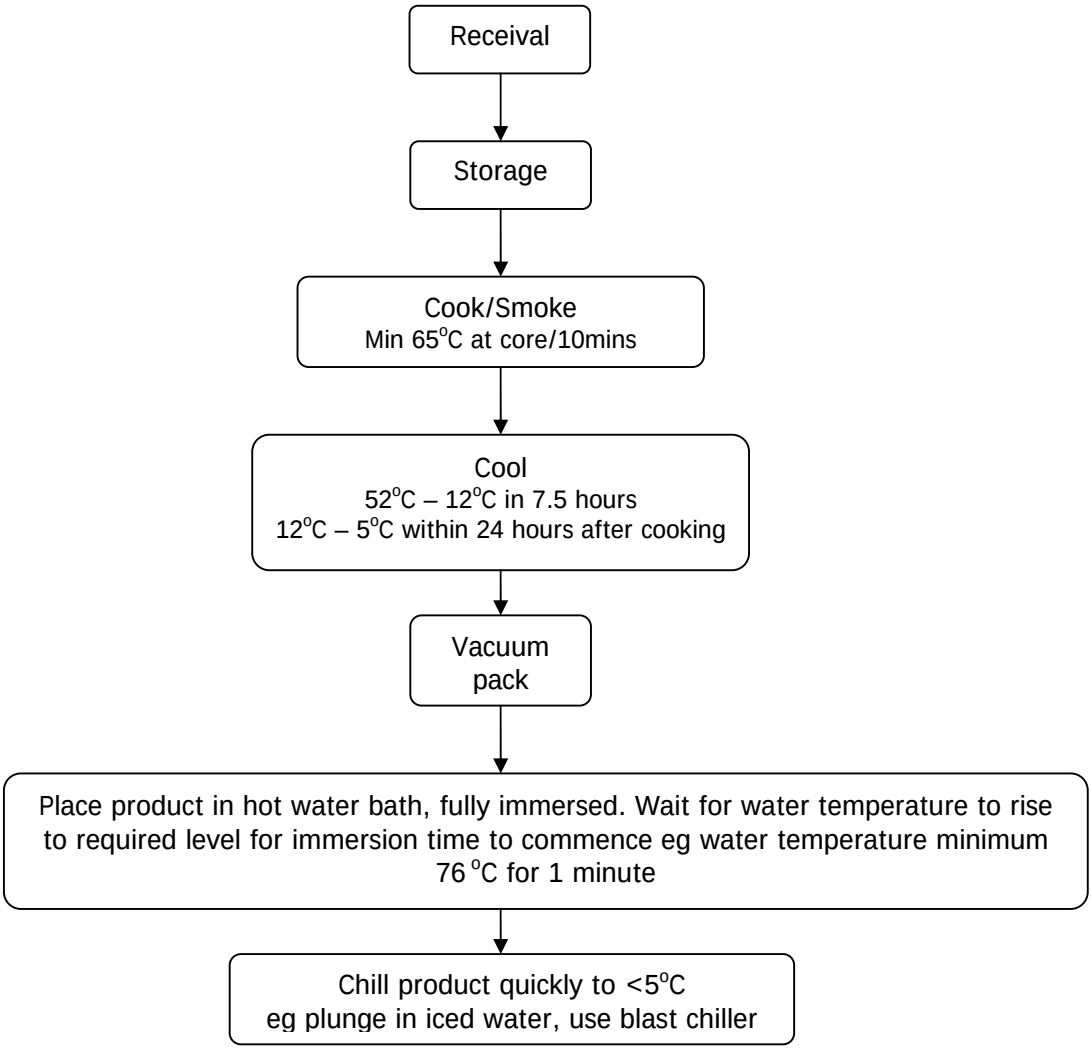
To qualify for approval to use in-pack pasteurisation, the following must be applied:

- A fixed calibrated temperature probe must be in place to make sure that the process reaches the correct temperature, and for the correct time
- If the product is pasteurised in the pack, the package cannot be re-opened or product re-packaged before it is sold.
- It is only suitable for packaged whole primal pieces (hams, silversides) or halves where the area of concern is the external meat surface only, not packaged sliced product.
- Procedure documented in FSP and approved by the NSW Food Authority (note: use of this booklet constitutes approval)
- The process must be verified by submitting a packaged product sample for testing for the presence *Listeria* every three months

**If you have an approved process for post-pasteurisation you do not need to conduct environmental swabbing of work surfaces.**

## 6. Example work instruction for post-pasteurisation

This is an example work instruction for hams using post-pasteurisation as a part of the packaging process.




For further information on post-pasteurisation of packaged meat products see Section 5 of this manual.

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## 7. Cleaning, sanitising and *Listeria* control

Every butcher shop and meat processor, no matter how small, should have a documented cleaning and sanitation program in place. An effective cleaning and sanitation program is essential in eliminating microorganisms, including *Listeria.* An inadequate cleaning program can leave behind food residues that may not be visible to the naked eye, but can lower the effectiveness of sanitisers used. A low number of surviving bacterial cells on equipment surfaces, after sanitation, can easily grow and multiply and contaminate product.

The cleaning program should cover:

a) the frequency at which equipment and environment is cleaned and sanitised,

b) how the equipment and environment is cleaned (eg manual cleaning),

c) what detergents and sanitisers are used and at what concentration,

d) who is responsible for doing the cleaning, and

e) daily checks to ensure cleaning and sanitation has been carried out.

Cleaning procedures should be conducted in a systematic way to avoid possible recontamination of treated surfaces. For this reason, buildings should be cleaned before equipment and equipment should be cleaned from highest point to lowest.

### Sanitising

*Listeria* is easily killed by heat, chlorine-based sanitisers and quaternary ammonia-based sanitisers. All equipment that comes into direct contact with RTE products should be sanitised (eg deli slicers, knives, benches, cutting boards).

All sanitisers should be used in accordance with the manufacturer's recommendations with particular attention to correct dilutions, temperatures and contact times.

Consultation with suppliers of sanitising compounds is highly recommended to ensure the compound applied is effective against *Listeria*, and is being used correctly.

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## 8. Fact sheet – *Listeria monocytogenes*

Listeriosis is a rare illness caused by eating food contaminated with the bacteria *Listeria monocytogenes*. The bacteria are common in soil and some raw foods. Eating foods that contain *Listeria* does not cause illness in most people.

**Who is most at risk?**

Pregnant women, newborns, people over 70 and those with weakened immune systems.

**How common is it?**

There are typically twenty to thirty cases of listeriosis reported each year in NSW. Although listeriosis is rare, it has a high death rate.

**What are the symptoms?**

The incubation period (the time between infection and symptoms) can vary from three to 70 days but on average is about three weeks. Infections can cause septicaemia (blood poisoning), meningitis (inflammation of the brain) and miscarriage in pregnant women.

Symptoms include fever, muscle aches and sometimes gastrointestinal symptoms such as nausea and diarrhoea.

In the more severe form, symptoms also include collapse and shock. If infection spreads to the central nervous system, symptoms such as headache, stiff neck, confusion, loss of balance, convulsions and coma can occur. About a third of these patients could die.

Infection during pregnancy can lead to premature delivery (abortion), infection of the newborn, and stillbirth.

**What are the causes?**

Most cases have been traced to ready-to-eat (RTE) foods, including pre-cooked chicken, sliced deli meats, pâté, processed meat paste, smoked salmon, shellfish products, soft and surface ripened cheeses and prepacked raw vegetables and fruit.

Because it can grow in refrigerators in temperatures as low as 1°C, controlling *L. monocytogenes* can be more difficult than other foodborne pathogens. It can grow in wet areas of food processing environments, such as floors and drains. It can grow in vacuum-packed products. It can spread by aerosols, factory personnel and transport vehicles, and is difficult to eradicate.

*L. monocytogenes* is killed by normal cooking temperatures and during pasteurisation of milk. However, it can survive freezing and is resistant to high levels of salt.

**How can the risk of infection be minimised?**

- Thoroughly cook raw food from animal sources such as beef, lamb, pork, or poultry

- Wash raw vegetables and fruit thoroughly before eating
- Keep raw meat separate from vegetables, cooked foods, and ready-to-eat foods.

  **Do not** allow the blood from raw meat to come into contact with other food.
- Use separate cutting boards for raw meat and foods that are ready-to-eat (for example, cooked foods and salads)
- Wash hands thoroughly before and after preparing food
- Wash knives and cutting boards thoroughly in warm, soapy water after preparing uncooked foods
- Wash hands after handling animals

Prevention is the most important control measure for foods which support the growth of the bacteria.

Pregnant women and other susceptible groups should not consume 'high risk' foods that can support the growth of *L. monocytogenes.*

This includes most chilled, ready to eat foods:

- Soft cheese such as brie, blue, fetta, camembert and ricotta. These are only safe if cooked hot
- Takeaway cooked and chilled diced chicken
- Cold meats, pâté and other meat spreads
- Pre-prepared or packaged salads greens and salads
- Raw seafood such as oysters, sashimi, smoked salmon or oysters (tinned oysters are safe)
- Unpasteurised dairy products such as raw goat's milk and Roquefort cheese
- Sushi and sandwiches that contain any of the foods listed above

Within the factory environment, it is essential to control the movement of produce and personnel to avoid cross-contamination between raw produce and finished produce.

Floors, walls and drains need to be kept clean and a disinfectant regularly applied to avoid build-up of bacteria. Air movement and aerosols must also be controlled. Critical control points such as cooking/heating temperatures, equipment cleaning and sanitation and specific product washing techniques must be monitored effectively.

**This fact sheet and other related fact sheets on pregnancy and foodborne illness can be found at www.foodauthority.nsw.gov.au**

## 9. Monitoring forms

Businesses that have to comply with General Circular 04/2008 that package ready-to-eat (RTE) meats need to complete product testing monitoring forms and either the environmental sampling forms, or the post-pasteurisation forms, depending on the type of system being used and product being packaged.

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**Monitoring form – Environmental swabs**

| Month | Area | Area name | Result | Corrective action |
|---|---|---|---|---|
| *eg May* | *1* | *Slicer* | *+ve* | *Sent to lab to confirm, clean area, product on hold and test* |
| | **1** | | | |
| | **2** | | | |
| | **3** | | | |
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**Swab 5 sites per month – in the event of a *Listeria* detection refer to the circular and guidelines**

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**Monitoring form – Environmental swabs**

| Month | Area | Area name | Result | Corrective action |
|---|---|---|---|---|
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| | **1** | | | |
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|---|---|---|---|---|
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| *eg May* | *1* | *Slicer* | *+ve* | *Sent to lab to confirm, clean area, product on hold and test* |
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| Month | Area | Area name | Result | Corrective action |
|---|---|---|---|---|
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**Swab 5 sites per month – in the event of a *Listeria* detection refer to the circular and guidelines**

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**Monitoring form – Product testing**

| Date | Product | Use by | Result | Corrective action |
|---|---|---|---|---|
| eg 1/5/08 | ham | 12/5/08 | -ve | Nil |
| eg 1/5/08 | Sliced devon | 14/5/08 | +ve | All product on hold, recall product, clean equipment |
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**Sample 1 packaged product every 3 months – if *Listeria* detected refer to the circular and guidelines**

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**Monitoring form – Product testing**

| Date | Product | Use by | Result | Corrective action |
|---|---|---|---|---|
| eg 1/5/08 | Ham | 7/5/08 | -ve | Nil |
| eg 1/5/08 | Sliced devon | 7/5/08 | +ve | All product on hold, recall product, clean equipment |
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**Sample 1 packaged product every 3 months – if *Listeria* detected refer to the circular and guidelines**

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**Monitoring form – Post-pasteurisation** (Record immersion time and temperature for 3 individual samples during each post-pasteurisation process)

| Date | Packaged product | Use by date/batch code | Immersion start time | Immersion finish time | Minimum water temperature during immersion time | Corrective action | Sign |
|---|---|---|---|---|---|---|---|
| eg 1/5/08 | Whole leg ham | 14/5/08 | 10am | 10.10am | 65°C | | |
| eg 1/5/08 | Piece of silverside | 12/5/08 | 11am | 11.02am | 76°C | | |
| eg 1/5/08 | Whole turkey breast | 12/5/08 | 11am | 11.02am | 76°C | | |
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| Date | Packaged product | Use by date/batch code | Immersion start time | Immersion finish time | Minimum water temperature during immersion time | Corrective action | Sign |
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| Date | Packaged product | Use by date/batch code | Immersion start time | Immersion finish time | Minimum water temperature during immersion time | Corrective action | Sign |
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