

# ENVIRONMENTAL SAMPLING FOR *LISTERIA* MANAGEMENT

If your food business produces ready-to-eat foods that will be stored in refrigeration for more than five days before being eaten, then you need a *Listeria* Management Program (LMP). Environmental sampling is central to the program. It helps to identify problems and target improvements.

*Listeria monocytogenes* is notorious in food factory environments, needing only a tiny niche to stick to, and a trace of food and water to thrive.

## There are five main approaches for *Listeria* control

- Written procedures for cleaning, sanitation and environmental monitoring
- Equipment and processing areas which are easy to clean and sanitise
- Floors are clean, dry and uncracked
- Procedures (GMPs) clearly define the process requirements needed to maintain microbiological control
- Movement controls help prevent *Listeria* moving into an area where product is exposed after cooking (e.g. for slicing or packing)

## Limitations of product testing

Presence of *Listeria* in food is typically sporadic and low level.

If 2% of packages contain *Listeria* and you test 100 samples from the batch there would still be a 13% chance of missing all the positive packages.

## The ultimate goal of environmental monitoring is to protect consumers from listeriosis

- The target goal is complete absence of *Listeria* in the post-cooking area (where product is exposed after cooking). The achievable goal is reduction of *Listeria* in the post-cooking area.
- An effective environmental monitoring program will sometimes yield positive samples. These help you to identify where corrections should be made to better protect consumers.
- If a new problem emerges, the monitoring and corrective action process will identify it and direct the business towards location of the 'growth niche' (the area where *Listeria* is growing and/or contaminating product).

## Each facility needs a customised environmental sampling system

- Sampling locations will be unique to your facility and processing line.
- A plan of the manufacturing area should clearly identify sampling points. Assign a code to these to allow easy and accurate sample labelling and identification of results.
- Sampling sites and frequencies will change based on results over time.
- Sampling should be risk based and should target potential growth niches and transfer points—including product contact surfaces—where there is a high potential for *Listeria* to move from one location to another.
- There are some common growth niches:
  - Floors, especially if damaged
  - Drains, especially where water pools
  - Areas where condensation collects and which are constantly wet



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- Chillers and refrigeration units that don't get cleaned often
- Damaged or porous contact surfaces, e.g. on trolleys or conveyer belts
- Pierced or hollow components where liquid can accumulate
- Areas with poor drainage
- Seams and small gaps in equipment that is difficult or impossible to take apart
- Potential transfer sites are areas where people, equipment, ingredients and unfinished products move within the factory:
  - Floors in high traffic areas
  - Pallet jacks and trolleys
  - Pull cords for doors
  - Water—either liquid or aerosol (high pressure cleaners are a well-known problem)
  - Equipment that rotates, spins or moves
  - Gloves used by employees
- Food contact surfaces are more likely to be transfer sites than growth niches:
  - Work tops
  - Trays
  - Knives
- Some equipment can provide both a growth niche and a transfer site:
  - Slicers
  - Dicers
  - Conveyor belts
- Samples should be taken at different times:
  - Prior to start up: these samples verify cleaning and sanitation and are expected to be negative. For better information, run the equipment empty and then swab it (contamination from equipment growth niches is often invisible until equipment is operational).
  - During operation: some businesses prefer to sample after at least two hours of operation to allow *Listeria* a chance to work its way out of the equipment.
  - At the end of operation: some businesses find end-of-day sampling to be the most informative.
  - If you have a second shift it also needs to be in the program and sampled.
- Use effective sampling techniques:
  - Sample large areas using sponge, gauze or cloth swabs.
  - Follow written sampling procedures which match the swab manufacturers' instructions.
  - Cotton-tipped, medical swab sticks can be useful when investigating small parts of equipment.
  - Start the sampling in high risk (post-cook) areas, and move through to low risk areas.
  - Sample sweepings, scrapings, rubbish, condensation, puddles and scrap product.
- Results of testing help determine the sample sites and the sampling frequency:
  - Licensed meat premises that package ready-to-eat meat products are required to implement an effective *Listeria* sampling plan. At a minimum, they are required to sample five sites monthly. That level of sampling might be applicable for a small, simple and easily cleaned facility. For most businesses, five samples per month would not be effective and would not provide the required level of business or consumer protection.
  - Food businesses that are larger, more complex or hard to clean should start by sampling multiple sites each week.
  - Sampling sites and frequency will change. Positive results lead to investigative sampling and possibly the introduction of another sampling site. Repeated negative results can indicate that site being dropped in favour of one with a higher level of risk.
  - As *Listeria* control improves, pooling swabs for testing can be used to reduce laboratory costs.
- Results of testing help determine the trend of *Listeria* detection in the business:
  - Results need to be reviewed by a qualified employee to show trends and identify



problem areas. The results must then be reported in a way that can be easily understood and interpreted by other staff.

- Businesses usually work out a simple, visual method to show the history of results.
- Small businesses might use coloured dots on a plan of the facility to show positive results. Larger businesses will generally need to use a simple spreadsheet:
  - > A list of environmental sample sites, grouped logically according to their location, would be the first column.
  - > Adjacent columns are used to record the test results for each day of testing. Typically '0' is used for a negative and '1' is used for a positive or suspect result. A blank means the site wasn't sampled in that day's testing.
  - > The number of positives and the percentage positive are calculated for each site and for each day's results.
  - > The percentage positive can be informative, as can the pattern of positive sites.

## More information

### Meat and Poultry Industries *Listeria* Summit presentations, July 2010

[www.foodauthority.nsw.gov.au/industry/news-publications-and-help/other-publications](http://www.foodauthority.nsw.gov.au/industry/news-publications-and-help/other-publications)

### *Listeria* Management Program

[www.foodauthority.nsw.gov.au/Documents/industry\\_pdf/listeria-management-program.pdf](http://www.foodauthority.nsw.gov.au/Documents/industry_pdf/listeria-management-program.pdf)

### Meat and Livestock Australia guidance

[www.mla.com.au/Publications-tools-and-events/Publication-details?pubid=4071](http://www.mla.com.au/Publications-tools-and-events/Publication-details?pubid=4071)

[www.mla.com.au/Publications-tools-and-events/Publication-details?pubid=3831](http://www.mla.com.au/Publications-tools-and-events/Publication-details?pubid=3831)

### Dairy industry guidance

[www.dairysafe.vic.gov.au/component/docman/doc\\_download/209-national-dairy-pathogen-manual](http://www.dairysafe.vic.gov.au/component/docman/doc_download/209-national-dairy-pathogen-manual)

[www.dairysafe.vic.gov.au/component/docman/doc\\_download/120-note-25-listeria-monocytogenes--management-in-dairy-factories](http://www.dairysafe.vic.gov.au/component/docman/doc_download/120-note-25-listeria-monocytogenes--management-in-dairy-factories)

### New Zealand guidance

[www.foodsafety.govt.nz/elibrary/industry/listeria-management-and-glossary.pdf](http://www.foodsafety.govt.nz/elibrary/industry/listeria-management-and-glossary.pdf)

[www.foodsafety.govt.nz/elibrary/industry/good-operating-practices.pdf](http://www.foodsafety.govt.nz/elibrary/industry/good-operating-practices.pdf)

[www.foodsafety.govt.nz/elibrary/industry/microbiological-testing.pdf](http://www.foodsafety.govt.nz/elibrary/industry/microbiological-testing.pdf)

(Recommended. Contains comprehensive guidance on mounting the response)

## Other international guidance

[www.fsai.ie/WorkArea/DownloadAsset.aspx?id=1234](http://www.fsai.ie/WorkArea/DownloadAsset.aspx?id=1234)

[www.food.gov.uk/multimedia/pdfs/lrmp.pdf](http://www.food.gov.uk/multimedia/pdfs/lrmp.pdf)

[www.meatami.com/ht/display/ArticleDetails/i/71693](http://www.meatami.com/ht/display/ArticleDetails/i/71693)

### Recall protocol

[www.foodstandards.gov.au/industry/foodrecalls/firp/pages/default.aspx](http://www.foodstandards.gov.au/industry/foodrecalls/firp/pages/default.aspx)



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About the NSW Food Authority: The NSW Food Authority is the government organisation that helps ensure NSW food is safe and correctly labelled. It works with consumers, industry and other government organisations to minimise food poisoning by providing information about and regulating the safe production, storage, transport, promotion and preparation of food.

Note: This information is a general summary and cannot cover all situations. Food businesses are required to comply with all of the provisions of the Food Standards Code and the *Food Act 2003* (NSW).



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More resources at [foodauthority.nsw.gov.au](http://foodauthority.nsw.gov.au)



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April 2013  
NSW/FA/F1173/1304