

# Protecting Your



...from

## *Listeria monocytogenes*

### ► Why is it a concern?

If contaminated foodstuffs reach the consumer, people can become ill or even die. If the contamination is linked to your product, you will need to issue a recall. Recalls result in lost sales, lost goods, and **most importantly lost brand equity**.

*Listeria monocytogenes* is a pathogen that can cause serious illness to humans. It causes a bacterial infection called Listeriosis. Listeriosis is associated with a variety of symptoms ranging from mild flu-like symptoms to death. The degree of illness depends on the person infected. People at highest risk for a severe case include the elderly, pregnant women, children and the immunosuppressed. About 5% of the 9,000 food poisoning deaths each year are due to Listeriosis.

### ► What is It?

#### Unique Characteristics

- Gram-positive Coccoid Rod
- Aerobic to Microaerophilic
- Psychrotrophic (34° - 113°F)
- More-heat-resistant-than *Salmonella*
- Grows in 8-12% NaCl
- Grows in pH of 4.4 - 9.6
- Pathogenic

Although *Listeria monocytogenes* is the only member of the *Listeria* family which causes human illness, the presence of any member of the *Listeria* family in a food processing environment indicates that conditions are favorable for *L. monocytogenes*.

This pathogen is typically transferred via food. Dairy products, processed meats, and some vegetables are the most common food products associated with *Listeria*.

*Listeria* is abundant in nature. It can be found almost anywhere. Because of its pervasiveness, there is a constant re-introduction of the organism into the food plant. It can never be eliminated from the food-processing environment. The goal is to CONTROL it within the production environment.

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## ► What food products can carry Listeria?

*Listeria monocytogenes* can be carried in:

- Dairy Products: cheese, milk, ice cream, non-fat dry milk
- Processed meat & poultry products: wieners, fermented sausages, ready-to eat products
- Vegetables: cabbage, lettuce, radishes, tomatoes, celery
- Fishery products VA

***In fact, the organism can be found in just about any damp environment.***

## ► How can it be identified?

*Listeria monocytogenes* can only be identified by plating techniques. This process takes several days to complete, and should be conducted by a skilled laboratory.

In the production environment, ATP rapid testing can be used as an indicator of surface cleanliness. The ATP test is not specific to *Listeria*. The test indicates the presence/absence of living/dead tissue matter.

## ► How can it be spread?

*L. monocytogenes* is abundant in nature. It can be isolated from soil, decaying vegetation, sewage, silage, dust, and water. The organism is often present in animal and human intestinal tracts.

The organism can be brought into the plant via raw materials. This includes the raw product to be processed as well as packaging, pallets, etc. Vehicular traffic can carry in contamination. Within the plant, rolling stock and foot traffic can move *Listeria* into sensitive areas, such as filler rooms, pack lines and RTE process areas.

Humans frequently spread the bacteria. *Listeria* can be carried into the process environment on soiled shoes. Improper hand care can also result in product contamination. (It is believed that up to 5% of the general population are carriers, but the percentage is much higher in particular groups, such as slaughterhouse workers.) Perhaps the most prevalent cause of contamination is food plant employees who neglect hygiene and/or sanitation procedures.

It has also been shown that post-pasteurization contamination of food products can occur in plants via aerosol formation of the organism. (When present in large numbers, the organism can survive in aerosol suspension for greater than 3 hours!) In addition to being carried by water droplets, *Listeria* can be transported throughout a plant by air via attachment to particulate material.

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### Real World Example

"Federal investigators theorize that construction dust laced with *Listeria* bacterium was the contamination source for tainted meats produced at a large mid-west meat processing plant. The plant's air conditioning was being repaired at the time tainted meat was processed; CDC officials think *Listeria* clinging to dust generated during construction may have contaminated the product."

Source: Construction Dust Contamination Is Latest Theory in *Listeria* Outbreak, Meat Business, February 1999, pages 16-17.

### ► Where is it typically found in a food processing environment?

Before a food processor can identify critical control points for a HACCP program, the processor must identify potential sources of *Listeria* and determine potential *Listeria* harborage sites within the food plant.

Past plant surveys have found *Listeria* in the following locations (listed approximately in the order of prevalence):

- floors drains
- cleaning aids such as brushes, sponges, etc.
- product and/or equipment wash areas
- food contact surfaces
- condensate
- walls and ceilings
- compressed air
- coolers

*L. monocytogenes* can survive on cold surfaces and also can multiply slowly at 24° F, defeating one traditional food safety defense-refrigeration. Commercial freezer temperature of 0°, however, will stop *L. monocytogenes* from multiplying.

Be observant for hard to reach equipment that is not easily accessible for regular and thorough cleaning. Those areas within the processing area that cannot be effectively cleaned and sanitized in a reasonable time with normal tools and supplies are perfect areas for *Listeria* to grow.

### ► How can it be controlled?

#### Management Commitment!

Management must be committed to expending the resources necessary to resolving the problem (controlling continual re-introduction of *Listeria* into the plant environment), protecting the business and brand equity, and assuring customer safety. Each operation needs to be following GMP (Good Manufacturing Practices) which includes cleaning and sanitation procedures for the entire operation. The plant also needs to develop a HACCP program. Coupled together, these programs will help to ensure that *L. monocytogenes* is kept in check.

**The controls for *L. monocytogenes* will be product and plant specific; however, the following general guidelines should be considered.**

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## ► Practices and Procedures - Key Points:

### GMP (*Good Manufacturing Practices*)

- Successful control of *L. monocytogenes* requires consistency and attention to detail.
- Cleaning and sanitation practices should be clearly outlined for specific plant operations. Care should be taken to address the following:
  - Priority should generally be given to product contact surfaces.
  - Isolate wet process areas from other production as much as possible.
  - Remove standing water as soon as possible.
  - Don't forget condensate. Check and clean collections systems regularly. Also, look for areas when condensation 'naturally' occurs, i.e. walls, ceilings.
  - Eliminate opportunities for cross contamination of raw and finished product.
  - Don't forget refrigerated areas! Infrequent cleaning of coolers used to hold cooked product is a common cause of *Listeria* problems. (Never clean coolers or other rooms when RTE product is present. Remove RTE product and carefully follow cleaner label directions for use.)
  - For heat-treated products, the focus is preventing recontamination of products during further processing following the heating step.
  - Never use a high-pressure hose to clear a drain (most common breeding ground for *Listeria*). An aerosol will be created that will spread contamination throughout the room.
- Mid-shift cleanups should be eliminated. They are counter-productive and increase the opportunity for spreading *Listeria* throughout the plant and make it more difficult to control.

### HACCP Program

- *Listeria* contamination arises when the organism has become established in a niche. When this happens, routine cleaning and sanitizing become ineffective. Special attention areas include:
  - Rollers for conveyors, especially the hollow type
  - On/off switches
  - Rubber seals around doors
  - Fibrous or porous type conveyor belts
  - Open bearings within equipment such as slicers, strippers, etc.
  - Hollow implements, including box cutters
  - Trash cans and other such ancillary items
  - Standing water in production areas
  - Cleaning tools, including mops and sponges
  - Drain backups

## ► Cleaning and Sanitizing Programs

### Product Contact Surfaces:

The sanitation program must include regular cleaning and sanitizing of product contact surfaces utilizing an appropriate EPA registered sanitizer. Cleaning and sanitizing product selection will be dependent upon the food product produced.

There is a difference between cleaning and sanitizing. The purpose of cleaning is to remove all soils from a surface. Soil can be visible or invisible. Cleaning generally removes the visible soil.

Invisible soils include microorganisms such as bacteria, yeasts and molds. The purpose of sanitizing is to reduce the invisible soils.

Consult your Ecolab representative for recommended products and procedures.

**Frequency:** Daily or as the law indicates

#### **Ecolab Sanitizers:**

- Ster-Bac®
- VortexX™
- Matrixx®
- Mikroklene DF®
- Quorum Clear/Claro®
- Mandate™
- Oxonia a Active®

*All products are equally effective in the inactivation of L. monocytogenes at label recommended use levels. Carefully follow the product label for use instructions.*

### Operational Conveyor Belts:

**Frequency:** Daily or as the law indicates

#### **Ecolab Products:**

SaniGlide® (dairy industry), and Lubri-Klenz Plus® (Brewing, beverage, dairy, & food processing).

*All products are equally effective in the control of L. monocytogenes at label recommended use levels.*

### Employee Hygiene:

Employee hygiene includes programs to protect clothing, head/facial hair, hands, and feet.

**Frequency:** Every time the employee enters the food processing area.

#### **Ecolab Products:**

- EcoCare™ hand soaps 250, 260, & 270, and hand sanitizers 350 & 360.
- EcoCare™ doorway systems using Quat or POAA
- EcoCare™ worker training

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## Drains and floors:

**Frequency:** Daily

**Ecolab Products:**

- Assur-Ring® Red (hot water)

*This product is effective in the control of Listeria monocytogenes at label recommended use levels.*

- Caravan® Drain Packets
- Bioaugmentation products: WCS 7701, WCS 7704, WCS 7705 & WCS 7706

*All products can be helpful in reducing plugged drain conditions. These products DO NOT directly kill or control Listeria. They can, however, help to keep pipes free flowing thus avoiding back-ups which could lead to contamination.*

*Be sure to follow label recommendations for use.*

## Environmental surfaces (non-food contact):

Environmental surfaces (non-food contact): Environmental surfaces include support structures, walls, ceilings, and other overhead areas. Quat products are ideal in this application. Ster-Bac is effective against *Listeria*.

**Frequency:** Daily/Weekly/monthly as the law indicates

**Ecolab Products:**

- Ster-Bac® (quat)

## Coolers:

**Frequency:** Weekly/monthly

**Ecolab Products:**

Cooler and freezers should be periodically thawed and cleaned and sanitized. Products listed under the Product Contact Surfaces section above can apply here.

For cleaning under 'frozen' conditions, Kool-Klean works without defrosting. This is a cleaner only. It DOES NOT sanitize the cooler/freezer. Follow label recommendations for use instructions.

## Air conditioning:

**Frequency:** Condensate drip pans-weekly/monthly  
HVAC-weekly/monthly

**Ecolab Products:**

Quat Block (CD-636)- see product label for specific uses.

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### ► Final Thoughts

It must be concluded that existing technology cannot eliminate *Listeria* from food processing plants. Therefore, the processing environment must be vigorously managed so that the probability of direct contamination from ingredients and surfaces and cross contamination from the environment are minimized. This will require the commitment of management to support the costs associated with implementing a *Listeria* control program. A sound *Listeria* control program is worth the investment **to protect your brand equity!**

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