

# Listeria monocytogenes in the Dairy Environment

## Background

*Listeria monocytogenes* is a bacterium common in the environment that can cause serious human disease. Listeriosis, the general name for illnesses caused by *L. monocytogenes*, is almost always caused by consumption of food contaminated with the organism. Groups of people at risk for serious illness include fetuses of pregnant women, newborns, the elderly, and people with weakened immune systems. Severe forms of listeriosis result from the organism infecting the blood (septicemia) and ultimately the nervous tissue or brain. Illness can begin 2-8 weeks after consuming contaminated food, which makes it difficult to trace to the source.



In the United States, an estimated 2,500 persons become seriously ill with listeriosis each year, with a high mortality rate of 20-30%; thus, *L. monocytogenes* is an important concern of the food industry. In response to outbreaks, the USDA and FDA established a “zero” tolerance policy for *L. monocytogenes* in ready-to-eat products.

## *L. monocytogenes* and the Food/Dairy Industry

*L. Monocytogenes* is widespread in the environment and has been isolated from:

- water
- soil and dust
- plants
- animal feed
- Feces and sewage

*Listeria* can be a common contaminant in the dairy environment, both on the farm and in the processing plant. On the farm, important sources include manure and improperly fermented silage. In the dairy plant, *Listeria* has been isolated from a variety of sites, although it is most frequently found in moist environments or areas with condensed or standing water or milk.



Pasteurization of milk is effective in destroying *L. monocytogenes*. However, post-pasteurization contamination can occur. *L. monocytogenes* can grow at refrigeration temperatures. The dairy industry's trend toward producing refrigerated products with longer shelf-lives exacerbates this problem.

# Prevention of *Listeria monocytogenes* Contamination

The Pasteurized Milk Ordinance and other food regulations are designed to protect the safety and quality of dairy products. Dairy processors should focus attention on preventing *Listeria monocytogenes* contamination in the processing environment. Processors should:

- Segregate raw milk and pasteurized product handling areas and equipment. On-farm processors must enforce restrictions that prevent cross-contact of the farm environment with the processing environment.
- Restrict unauthorized persons from the processing area, including truck drivers, receivers and raw product handlers. People who have been on the farm should not be allowed in the processing area as they are likely to carry contaminants on their boots and clothing.
- Ensure that separators/clarifiers are properly cleaned and maintained and that they de-sludge directly to a drain.
- Develop an environmental cleaning, sanitizing and monitoring program that includes plant and cooler floors, drains, milk case handling areas and equipment and piping exteriors. Monitoring programs should include regular testing of environment for *L. monocytogenes* or *Listeria* spp. with a clear follow-up plan that will occur if samples test positive.
- Keep all brushes and equipment used for environmental cleaning separate from food contact brushes and equipment. Mark or color code equipment and brushes.
- Prevent stagnant liquid on plant floors. All floors should slope to nearby drains. All drains should be free-flowing and cleaned and sanitized routinely. Repair cracked floors.
- Avoid creating aerosols during processing, especially in the milk storage and packaging areas. Aerosols can carry harmful bacteria. Do not use high-pressure to clean drains.
- Validate daily that cleaning, sanitizing and maintenance of equipment is effective and performed to prevent post-processing contamination.
- Avoid touching milk contact surfaces that have been cleaned and sanitized. If it is necessary to disassemble equipment during processing, clean and sanitize before reassembling.
- Provide adequate training and guidance for all workers in personal health and hygiene, Good Manufacturing Practices and plant sanitation procedures.
- Develop a HACCP-based program integrating prevention, validation, and an action plan for possible program deviations including well defined procedures for product recalls.

**Environmental testing to validate environmental cleaning programs is highly recommended.** *Listeria* testing should be done by an outside or off-site laboratory to avoid potential propagation in the plant environment.

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Want more information on [Listeria monocytogenes](https://foodsafety.foodscience.cornell.edu/mqip/) and the MQIP? Contact Nicole Martin (nicole.martin@cornell.edu) in the Milk Quality Improvement Program or visit our website

<https://foodsafety.foodscience.cornell.edu/mqip/>

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