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## ***Listeria monocytogenes* in Dairy Products**

*Listeria* bacteria are widespread in the environment and have been identified in water, soil, dust, plants, animal feeds, feces and sewage. Many animals can carry the bacteria without appearing sick and can contaminate foods, such as meats and dairy products. *Listeria* has been isolated from many types of foods including unpasteurized (raw) milk or foods made from unpasteurized milk, red meats, poultry, seafood, vegetables, and fruits.

*Listeria* can be a common contaminant in the dairy environment, both on the farm and in the processing plant. On the farm, the animals themselves can be the source but *Listeria* is usually found in manure and improperly fermented silage. Various studies have found 2-8% of raw milk samples tested contain *Listeria monocytogenes*. In the dairy plant, *Listeria* is most frequently found in moist environments or areas with condensed or standing water or milk, including drains, floors, coolers, conveyors and washing areas.

Once in food, it grows readily. Human illness has been caused by *Listeria* in dairy products such as raw milk, raw milk soft cheeses, as well as deli meats, and hotdogs. Because illness onset typically occurs several weeks after eating contaminated food, it is often difficult to trace the illness back to the source. While most healthy people do not become severely ill, certain groups of people are at risk for serious complications. People at higher risk include pregnant women, newborns, the elderly, and people with weakened immune systems due to chronic illnesses or treatment of illnesses, such as AIDS or cancer.

The milder cases of listeriosis may cause flu-like symptoms that can include fever, muscle aches, and occasionally gastrointestinal symptoms such as nausea or diarrhea. The more severe forms of listeriosis result when the organism infects the blood (i.e., septicemia) and ultimately the nervous tissue or brain (i.e., meningitis and/or encephalitis). In these cases, the symptoms include headache, stiff neck, confusion, and loss of balance or convulsions.

While a *Listeria* infection during pregnancy may be asymptomatic or only cause flu-like symptoms in the mother, it can lead to severe infection of the fetus, causing premature delivery, spontaneous abortion or stillbirth. According to the CDC, approximately 2,500 persons become seriously ill with listeriosis each year in the United States; the fatality rate among persons with severe infection is approximately 20-30%. In response to outbreaks, the USDA and FDA established a "zero" tolerance policy for *Listeria monocytogenes* in ready-to-eat products. Listeriosis is a reportable disease in Alaska and there are anywhere from 0-3 cases reported per year.

### **Does *Listeria monocytogenes* survive pasteurization?**

Pasteurization of milk effectively destroys *Listeria monocytogenes*. However, post-pasteurization contamination can occur within the processing plant. *Listeria* is capable of growing at refrigeration temperatures; therefore, even very low numbers of *Listeria* in processed dairy products can multiply to dangerous levels, despite proper refrigeration. An adequate sanitation program and good hygiene practices are essential in food processing and handling areas.

### **How can contamination with *Listeria monocytogenes* be prevented?**

Focusing on the contamination risks at the food handling, storage and processing level, researchers have found that processing equipment like holding tanks, storage coolers, table tops, and conveyor systems are all vulnerable to contamination as well as other sites such as drains, floors, and storage areas. *Listeria* can be spread from processing equipment and table tops to food products through the ventilation system, from dripping and splashing when cleaning with high powered hoses, and by workers themselves.

The Pasteurized Milk Ordinance and other food regulations are designed to protect the safety and quality of dairy products, so adherence to these regulations is critical. Dairy processors also should focus attention on preventing *Listeria monocytogenes* contamination in the processing environment; and preventing cross contamination to pasteurized products.

## **Key points that Dairyman and Processors should consider**

### **Facility Construction and Biosecurity Issues:**

- Restrict access to the milk house and processing areas. Anyone who is on the farm (visitors and field workers) should not be allowed in the processing area of a dairy plant as they are likely to carry contaminants on their boots and clothing.
- Use a properly constructed facility. Floors must slope to drains so no water or milk pools. Floors and walls should be smooth and easy to clean; cracks and pits are prime areas where bacteria like *Listeria* grow. Drains should be free flowing.
- Separate equipment. Keep all brushes and equipment used for environmental cleaning separate from any brushed or equipment that comes in contact with milk or dairy food products. Brushes, mops or cleaning equipment used for floors and drains should be used only for that purpose.
- Prevent splashing and spraying. This is especially important in milk storage and packaging areas where less rigorous cleaning occurs. Splashing and spraying spreads bacterial pathogens that can contaminate safe food products and ingredients.
- Don't cross-contaminate. Prevent cross-contamination of raw milk to pasteurized milk and processed food products. Separate raw milk handling areas and equipment (e.g., brushes, pails/containers, utensils, piping, tanks) from areas and equipment used for pasteurized product.
  - On-farm processors must enforce restrictions and procedures that prevent cross-contact of the dairy farm environment and milking parlor with the milk storage area and processing environment (limit access, good hygiene, and clean clothes/boots).
- Test your facility for *Listeria* and other food borne pathogens; have a plan for follow-up actions if samples test positive.

### **Cleaning and sanitation issues:**

- Develop a cleaning plan for everything including equipment (milking machines, pipeline, sinks, buckets etc.), utensils, tables, plant and cooler floors and walls, drains, and piping exteriors.
  - Do daily cleaning, sanitizing and maintenance of all milk processing, storage and packaging equipment and rooms. Milk concentrates in filters and separators/clarifiers where large numbers of *Listeria* can occur. Avoid hand contact with equipment and utensil surfaces that have been cleaned and sanitized.
  - Keep a chart or check off list available for workers to initial or sign that will indicate the cleaning and sanitation has been completed on schedule.
  - Avoid using high-pressure hoses to clean floor drains because they are one of the common areas where *Listeria* is found. The water pressure sprays and splashes *Listeria* as well as other bacterial pathogens into other places.
- Train everyone working in your facility. They should not work when they are sick. It is essential that they wash their hands before working with any food, and know how to clean and sanitize the equipment and the facility. This is the most important step to control contamination with food borne pathogens.

## **Should you test for *Listeria* in your dairy plant, creamery or food processing area?**

Testing food products and finished dairy products should be conducted when required by state regulations or to validate a new food production process prior to entering into commercial markets. A number of food and dairy processing groups (Slow Foods, Raw Milk Cheese makers Association, American Raw Milk Cheese Presidium, American Cheese Society) including raw milk advocates, such as Price Weston, also recommend environmental testing including the testing of raw milk on a regular basis. Environmental testing to evaluate facility cleaning is highly recommended and can be incorporated into a quality management plan.

## **What should you do if you've eaten a food recalled because of *Listeria* contamination?**

The risk of an individual person developing a *Listeria* infection after consumption of a contaminated product is small. If you have eaten a contaminated product and do not have any symptoms, no tests or treatment are recommended, if you have any questions or are in a high-risk group contact your primary care physician for guidance. If you are in a high-risk group, have eaten the contaminated product, and within 2 months of eating it you become ill with fever or other symptoms of listeriosis, you should contact your physician immediately and inform him or her that you were exposed to a product contaminated with *Listeria*.

### **References:**

CDC General Information:

<http://www.cdc.gov/nczved/divisions/dfbmd/diseases/listeriosis/>

[http://www.cdc.gov/pulsenet/pathogens\\_pages/Listeria\\_monocytogenes.htm](http://www.cdc.gov/pulsenet/pathogens_pages/Listeria_monocytogenes.htm)

<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5740a1.htm>

FDA/CFSAN Bad Bug Book - *Listeria monocytogenes*:

<http://www.cfsan.fda.gov/~mow/chap6.html>

State of Alaska Dept of Health and Social Services:

[http://www.epi.hss.state.ak.us/bulletins/docs/b2009\\_29.pdf](http://www.epi.hss.state.ak.us/bulletins/docs/b2009_29.pdf)