



Ready-To-Eat Foods and Listeriosis

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Listeria monocytogenes is a pathogenic bacterium that is found in the environment, such as in soil, water, vegetation, and surfaces of equipment, floors, and walls; it is also often carried in the intestines of healthy humans and animals. Foods can easily become contaminated simply by contact with a surface contaminated with listeria. To make matters worse, listeria can survive—and grow—under refrigerated conditions, making packaged ready-to-eat (RTE) foods prime carriers, because they are designed to be eaten without further cooking.

Some food products from which listeria has been isolated are soft cheeses, unpasteurized milk, imported seafood products, frozen cooked crabmeat, cooked shrimp, and cooked surimi (imitation shellfish). Food contaminated with listeria is considered adulterated.

Consumption of listeria-contaminated food can cause the illness listeriosis, which is potentially fatal in certain susceptible people. Those in particular danger from this disease are newborns (even though symptoms may be relatively mild in the mother), the elderly, and persons with weakened immune systems, such as those with chronic disease or human immunodeficiency virus (HIV) infection or those undergoing chemotherapy. Pregnant women are 20 times more likely than healthy adults to get listeriosis.

It is believed that eating an extremely small amount of the bacteria—fewer than 1000—can be harmful to susceptible individuals. The incubation period between infection and onset of symptoms usually varies from a few days to four weeks.

Listeriosis may cause such serious conditions as septicemia, meningitis, and encephalitis. In pregnant women it can cause intrauterine or cervical infections that may result in spontaneous abortion (2nd–3rd trimester) or stillbirth.

Listeriosis may be preceded by influenza-like symptoms including persistent fever and muscle aches. Gastrointestinal symptoms such as nausea or diarrhea may be observed within 12 hours after contaminated food is

eaten. These symptoms are associated with the use of antacids or cimetidine, an antihistamine, and may precede listeriosis or be the only symptoms expressed.

Listeriosis is of significant concern to susceptible people in particular and the food manufacturing and food service industries in general because it is so lethal. Overall mortality from perinatal/neonatal infections is greater than 80%, from listeric meningitis as high as 70%, and from septicemia, 50%. Antibiotics are usually promptly given upon diagnosis of listeriosis, but infections resulting in death may still occur. According to the Centers for Disease Control and Prevention, there are an estimated 2493 cases of listeriosis and 499 deaths per year—a mortality rate of one in five!

Avoiding listeriosis

The general guidelines for prevention of listeriosis are similar to those given for other foodborne diseases:

- Handle raw foods with care:
 - Thoroughly cook raw food from animal sources, such as beef, pork, or poultry.
 - Thoroughly wash raw vegetables before eating.
 - Separate uncooked meats from vegetables
 - Separate uncooked meats from cooked foods and RTE foods.
 - Avoid unpasteurized (raw) milk or foods made with unpasteurized milk.
- Wash your hands, knives, and cutting boards after handling uncooked foods.
- Consume perishable and RTE foods as soon as possible.

Food handlers in the food service industries should follow these recommendations to protect the public from adulterated food.

Also, those who are at high risk of contacting listeriosis—and their caregivers—should be aware of the following precautions:

- Do not eat salads made in the store, such as ham salad, chicken salad, egg salad, tuna salad, or seafood salad.
- Do not treat hot dogs, luncheon meats, and deli meats as RTE foods: reheat them until steaming hot before eating.
- Avoid getting fluid from hot dog packages on other foods, utensils, and food-preparation surfaces. Thoroughly wash your hands after handling hot dogs, luncheon meats, and deli meats.
- Eat cheeses prepared only from pasteurized milk; beware of soft cheeses such as feta, Brie, and Camembert, blue-veined cheeses, or Mexican-style cheeses such as queso blanco, queso fresco, and Panela.
- Avoid refrigerated pâtés or meat spreads (canned or shelf-stable pâtés and meat spreads may be eaten).
- Avoid refrigerated smoked seafood unless it has been reheated until steaming hot or is contained in a cooked dish, such as a casserole. Refrigerated smoked seafood, such as salmon, trout, whitefish, cod, tuna or mackerel, is most often labeled as “nova-style,” “lox,” “kippered,” “smoked,” or “jerky” and is found in the refrigerated section or sold at deli counters of grocery stores and delicatessens. Canned or shelf-stable smoked seafood may be eaten.

Implications for food manufacturers

If listeria is already present in a product's ingredients, a processing error such as an incorrect formulation or inadequate processing time or temperature can result in the finished product containing the live pathogen. Even if this product has successfully undergone a lethality treatment, listeria contamination is still possible through several means:

- contact with biofilms on surfaces of processing, handling, or packaging equipment
- use of equipment that has not been designed for easy cleaning and has hard-to-reach niches that can harbor pathogens
- exposure to environmental contamination or cross-contamination in the processing environment encountered after the lethality treatment, such as in facilities that
 - are undergoing construction or remodeling
 - are poorly designed or laid out
 - have unacceptable traffic flow from a raw-product area to exposed finished products.

Beginning in the fall of 2004, the Food Safety and Inspection Service (FSIS) of the United States Depart-

ment of Agriculture (USDA) mandated that all establishments producing ready-to-eat foods that are exposed to the environment after lethality treatments shall have effective listeria control measures. Those establishments are now required to develop written Hazard Analysis and Critical Control Point (HACCP) programs and Sanitation Standard Operating Procedures (Sanitation SOPs) or other prerequisite programs. All companies will have to test plant surfaces and equipment for listeria, but they will not be required to routinely test their products. Establishments are also required to verify the effectiveness of their programs and share the results with FSIS, which will conduct its own verification activities. FSIS is allowing establishments, as an opportunity to inform consumers, to make food safety enhancement claims on their RTE product labels that describe the processes used to eliminate or reduce listeria or suppress its growth in the products.

To control listeria, establishments are mandated to incorporate one of three strategies:

1. Use **both** a post-lethality treatment **and** a growth inhibitor for listeria on RTE products. Establishments opting for this strategy, which typically involves heating packaged products with steam or hot water, will be subject to FSIS verification activity that focuses on the effectiveness of the post-lethality treatment. Sanitation is built into the degree of lethality necessary for safety as delivered by the post-lethality treatment.
2. Use **either** a post-lethality treatment **or** a growth inhibitor for listeria on RTE products. Establishments opting for this strategy will be subject to more frequent FSIS verification activity than for Strategy #1.
3. Use sanitation measures **only**. Establishments opting for this strategy will be targeted with the most frequent level of FSIS verification activity. FSIS will place increased scrutiny on operations that produce hot dogs and deli meats, identified in a 2001 risk ranking by FSIS and the U.S. Food and Drug Administration (FDA) as products posing relatively high risk for illness and death. Specifically, sliced turkey and sliced chicken are ranked as posing the highest risk for listeria contamination.

A petition was filed with the FDA in August 1999 to allow irradiation of RTE meats and poultry, but irradiation is still not an option for killing listeria on RTE meats because the FDA has not yet approved it for this use.

Sources: FSIS, News and Information, December 15, 2003. FoodHACCP.com Newsletter, December 8, 2004.