

LISTERIA FACT SHEET

LISTERIA – There are six different species of the bacterium *Listeria*. Only one of these species *Listeria monocytogenes* (*L. monocytogenes*) causes human illness – the others are usually harmless for humans. *Listeria* can be found almost everywhere and has been isolated from a number of sources, including soil, water and foods. It has evolved the ability to survive in a variety of different environmental conditions, including moist environments like refrigerators, and under a variety of stress conditions.

STRAINS – Within *L. monocytogenes*, a multitude of different strains (e.g. more than 300 strains identified in one study) have been documented. Strains can be defined by a variety of methods, including a process known as pulsed-field gel electrophoresis (PFGE) which gives different “genetic fingerprint” patterns.

LISTERIA AND FOOD – *Listeria* can be found in unprocessed food such as raw dairy products, meat, poultry, fish, as well as processed foods such as deli meats, hot dogs, cheese and ice-cream. It is sometimes found in raw vegetables. It can also be spread with an infected product or surface, such as hands or kitchen counters during food preparation.

LISTERIOSIS – This is the serious infection caused by eating food containing *L. monocytogenes*. Listeriosis usually occurs only in people with weakened immune systems (e.g. AIDS patients, organ transplant recipients, cancer patients), the elderly, pregnant women, and newborns. The infection can begin with fever and gastrointestinal symptoms, but can spread to the blood stream and/or the nervous system giving symptoms of meningitis. In pregnant women, *L. monocytogenes* can also spread to the fetus, causing premature delivery, miscarriages or infections of the newborn baby.

For more information about Listeriosis visit the Public Health Agency of Canada website at www.publichealth.gc.ca.

INCUBATION PERIOD – The incubation period can be as much as 70 days after exposure for the more serious forms of Listeriosis, however symptoms usually appear within two to 30 days. For the milder forms, it can be as little as one day.

INCIDENCE OF ILLNESS – The disease listeriosis is very rare, affecting an estimated 1-5 in 1,000,000 people per year in most developed countries. In people contracting the disease it can be very serious - an estimated 20% of people with this disease die due to listeriosis. Pregnant women are 20 times more likely to get listeriosis (as compared to healthy individuals), and account for about a third of all listeriosis cases. Persons with AIDS are about 850 times more likely to get listeriosis, as compared to healthy individuals.

CONSUMER RISK – Even if *L. monocytogenes* is absent in ready-to-eat meat and poultry products after processing, or found at very low prevalence and levels, additional contamination can occur after the packs are opened - especially when the meat is handled. Although *L. monocytogenes* can grow while refrigerated, growth is very slow at temperatures below 4°C. In ready-to-eat foods stored at higher temperatures, for example above 7°C, growth occurs more rapidly, increasing the risk that *L. monocytogenes* will reach levels more likely to cause human illness. Both safe food handling and maintaining proper refrigeration temperatures are critical to minimizing the risk of listeriosis.

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COOKED MEAT – Listeria is killed by cooking. Thoroughly cooking product to 165°F/74°C will kill the bacteria. Consumers at high risk for contracting listeriosis (e.g. pregnant women and the elderly) should reheat deli meats immediately before consumption.

FREEZING – Listeria is not killed by freezing. Growth is arrested altogether, but normal growth will be resumed after thawing.

DELI PLANTS – Listeria is everywhere, so elimination is out of the question. Listeria is expected to enter any meat plant with raw materials and personnel and once inside, it can live almost anywhere – on floors, drains, cooling, ventilation, slicing and packaging equipment. The strategy for the food industry remains one of risk mitigation driven by robust surveillance and sanitation programs. Regular cleaning and sanitation is needed to prevent growth and survival of this organism, including disassembly and deep cleaning in harbourage points of equipment, and contamination of the surfaces in contact with ready-to-eat meats.

SURVEILLANCE – Control of Listeria in a manufacturing plant is monitored by a program of regular swabbing and sampling from the plant “environment”. There are standard remedial procedures for immediately re-testing any sites that test positive for Listeria species, including supplementary cleaning protocols. Environmental testing is industry best practice to detect and manage Listeria in a food processing plant. It is more informative than finished product testing, as it points to the source as a target for further sanitation.

INFECTIVE DOSE – How many bacteria are needed to cause an infection? The quantity of bacteria on food is expressed as the number of colony-forming units per gram (CFU/g). Levels of 100 CFU/g in food at point of consumption are regarded as safe, meaning that people consuming foods with low levels of *L. monocytogenes* have an extremely low risk of contracting listeriosis. As with all disease-causing micro-organisms there is no threshold below which there is a true “zero” risk for human illness. Estimates based on US data suggest though that less than 0.2% of the 2,500 listeriosis cases that occur annually in the US are caused by foods contaminated with 100 or less CFU per serving. By contrast, more than 80% of these cases are caused by foods contaminated with more than one million CFU per serving. Thus foods that contain extremely high levels of *L. monocytogenes* represent the main risk for consumers.

CARRIERS – Companion animals (pets) and humans can be asymptomatic carriers of *Listeria monocytogenes*. Transmission of *L. monocytogenes* by a carrier to another person is probably rare, due to the small dose of bacteria received. Equally airborne infection is rare and has never been reported.

LIVESTOCK – All classes of livestock and thus raw meat may contain Listeria. Raw meat must therefore always be treated as a potential source of *L. monocytogenes*.

RESISTANCE TO SANITIZERS – There is evidence that some strains of Listeria monocytogenes may show resistance to certain sanitizers, including quaternary ammonia-based sanitizers. In addition and more importantly, *L. monocytogenes* can survive and multiply in harborage points in processing plants. These harborage points may be places that cannot be reached by sanitizers. Identification and elimination of harborage points, for example with the help of environmental sampling and testing programs, is thus crucial for controlling *L. monocytogenes* in food processing plants.

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L. MONOCYTOGENES CONTAMINATION AT THE BARTOR FACILITY– This was investigated by a global panel of leading Listeria experts. The panel concluded that the most likely source of the Listeria contamination was a harborage point deep within the slicing equipment. Other possible factors and entry points were nearby drains and a service elevator. The panel recommended additional enhancements to the Company's extensive cleaning and environmental sampling procedures be introduced for all possible risk areas.

THE INCIDENCE OF LISTERIA MONOCYTOGENES IN PRODUCTS – Based on finished product testing conducted at Bartor Road from production since start-up through to and including October 2nd:

- The Bartor Road rate is 0.1% (four in 3,850 test results).
- According to USDA Food Safety and Inspection Services data, the rate in :
 - Ready-to-Eat (RTE) Meats and Poultry products is in the range of 0.3 to 1% - **this is three to 10 times higher than at Bartor Road.**
 - In Deli and Sliced Meats, the number was 0.8% – **this is eight times higher than at Bartor Road.**
- According to the Journal of Food Protection, by Gomas et al, the incidence in RTE foods is “up to 0.4%”
- In Canada, the incidence in beef and poultry RTE vacuum packed products was found to be 3 to 5% based on a 2006 study from the University of Alberta
- The bacteria is highly prevalent in raw meat cuts (raw materials coming into the plant). Numerous studies have shown prevalence to be in the 20 to 30% range.

THE INCIDENCE OF LISTERIA MONOCYTOGENES IN THE ENVIRONMENT - Based on environmental testing for Listeria species conducted at Bartor Road from production since start-up through to and including October 2nd:

- The Bartor Road rate is 0.15% (one in 671 test results)
- According to USDA Food Safety and Inspection Services data, the incidence in North American plants of *Listeria mono.* (which is a subset of the Listeria Species we use) is 1.9% - **about 13 times higher than at Bartor Road.**

ERADICATION – Listeria is everywhere, so elimination is out of the question. Instead, the strategy for the food industry remains one of risk mitigation driven by robust surveillance and sanitation programs. A major part of this is to detect the presence of *L. monocytogenes* in processing plants before it reaches food contact surfaces and product, and to immediately control the bacteria as soon as it is found. In addition, efforts to reduce introduction of the organisms into food processing plants are critical. As well, design and use of food processing equipment that does not represent growth niches for this organism is critical. Finally, it is important that efforts continue to understand the ability of this organism to survive and multiply under adverse conditions, and that this knowledge is used to design new strategies for control.