

Diversey 



Controlling Listeria In Food Service

Listeria Control Guide

Listeria is a universal problem for food manufacturers, food service operators and food retailers. The risk to human health is significant and an outbreak in a food handling facility most likely results in suspended operations.

The aim of this *Listeria* control guide is to provide a practical understanding of *Listeria monocytogenes* and recommendations how to prevent and control it. The first part of this guide outlines the general characteristics of the organism, the presence of *Listeria* in food, and Listeriosis. The second part describes possible interventions to limit *Listeria* growth in the food handling environment, standard hygiene procedures to apply and methods to trace *Listeria* sources.

1. General characteristics of *Listeria*

Listeria monocytogenes can be considered a ubiquitous organism, widespread in nature, the environment, in living organisms and in food. The organism has saprophytic ability (deriving nourishment from dead or decaying organic matter) and demonstrates extreme resistance to dehydration, physical agents and environmental conditions. Dust, mud and wet soils can contain a large number of cells. In addition *Listeria* bacterium can be easily isolated from many types of tissues, vegetable, silage, water sewage and surface water, such as rivers and lakes.

2. Listeriosis

Key concern about *Listeria* is the seriousness of the disease it causes, known as listeriosis. In most individuals, listeriosis begins with flu-like symptoms, but it can progress to life-threatening sequelae such as septicemia, encephalitis, endocarditis, or miscarriage, especially in those individuals who have weakened immune systems. Individuals with listeriosis have a high hospitalization and a mortality rate. Although listeriosis is a very serious disease, it also is relatively rare. According to the Centers for Disease Control (CDC), the annual reported incidence of listeriosis in USA is approximately 3 cases per 1,000,000 Americans. A similar number is reported in other countries.

Another feature of the disease is the time latency, which is highly variable, from 1 to 70 days. This means that it is often impossible to trace back to the food source that caused the disease.

3. *Listeria* in food

Listeria is often found in raw milk and milk-products, but also in processed meat, fish, pickled and raw vegetables, and cold salads. The spread of the microorganism can be explained by a number of unique properties. First, as already mentioned, the environmental ubiquity leads to it being widespread throughout the environment. But in addition, *Listeria monocytogenes* has the ability to:

- ▶ multiply, from - 1.5 °C (29 °F), although slowly, and rapidly even at temperatures of 3-9 °C (37.5 - 48 °F)
- ▶ grow in the presence of a salt concentration up to 10%
- ▶ grow in an aw of 0.94
- ▶ grow in a relatively high pH (up to 9.9)

These features are not present, or present only in part in other bacterial strains found in foods and they make it challenging to control *Listeria* growth in food. So, always separate cooked and uncooked food, keep fridges and freezers clean, make sure to cover food properly and never store ready-to-eat food beyond the use-by-date.

4. Controlling *Listeria* growth in food

a. Additives and preservatives

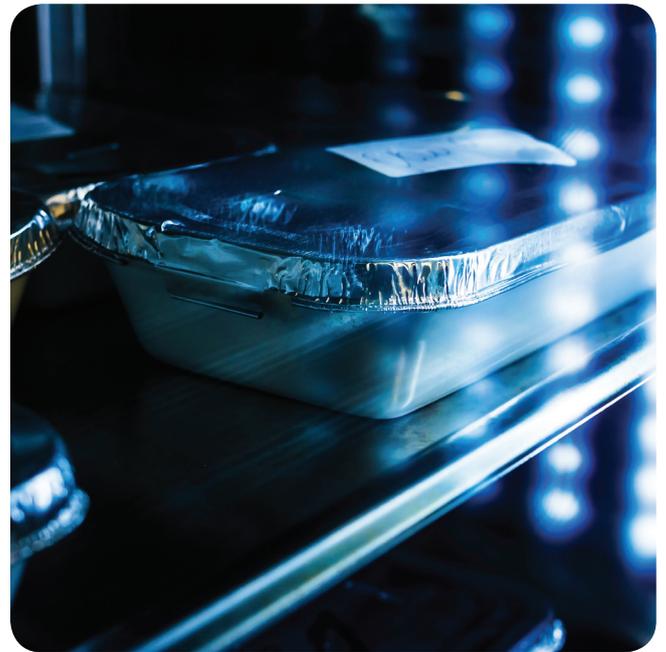
Listeria monocytogenes does not show resistance to the additives and preservatives normally used in food production. It is key to control others factors such as the concentration of saline, aw, pH, microbotic flora, and specific temperature.

b. Protective atmosphere

Listeria monocytogenes has the ability to grow in the presence of reduced oxygen.

c. Cold/Heat treatment

Listeria monocytogenes is, however, not particularly heat resistant; it is now universally recognized that a heat treatment, for example like pasteurization of milk 72-76 °C (161.5-169 °F) for 15 - 20 second, reduces the contamination and is considered to be highly effective.



5. Controlling *Listeria* in the environment

The building and process area should be hygienically designed to facilitate thorough cleaning. Any damage to the building fabrication should be repaired immediately: cracks and crevices can harbour *Listeria* therefore maintenance is critical.

a. Managing the facility environment

The building and food handling processes should be hygienically designed to facilitate thorough cleaning and any damage to the building fabrication or equipment and utensils should be repaired immediately. Cracks and crevices can harbour *Listeria*, therefore maintenance is critical.

b. Hygiene programme

Listeria control is not about sanitizers or disinfectants, it is about cleaning. It does not matter what disinfectant you use, you MUST clean really well before the sanitizer or disinfectant can be effective, or you need to use a very effective combined cleaner/disinfectant on continuous basis. A sequenced hygiene program is critical to avoid cross contamination. The program must be carried out using chemicals at their recommended concentration, optimum temperature and required contact time.

c. Keeping food contact surfaces clean

Cleaning with a detergent will remove food soil and the majority of *Listeria* from surfaces. A sanitizer or disinfectant step will then reduce any remaining microbes to as low a level as possible. Disinfectants must be EPA/ FDA approved (USA), pass European EN1276 or other

relevant tests, and meet any other (local) regulatory requirement. Many people think that *Listeria* is very resistant to antimicrobial agents. But it is not. It is as sensitive to disinfectants and sanitizers as many other bacteria. Thus many products, even those without specific claim, may be effective in controlling *Listeria*. The point is: *Listeria* can be very common and spreads easily, and thus recontaminates very quickly, so you need to clean and disinfect frequently and effectively!e. Keeping food contact surfaces clean

d. Preventing cross contamination

Listeria is easily transferred throughout a facility if measures are not in place to prevent it. Cross contamination can result from a number of sources including; raw materials, packaging and equipment, aerosols, and poor hygiene. The design of the facility and process flow are critical for prevention with steps such as segregated and colour coded equipment, clear wash room procedures and removal of packaging prior to cleaning, all helping to prevent the spread. Trolleys and other items that move from one part of the facility to another can cause rapid spreading.

e. Cleaning and disinfecting cleaning equipment

Cleaning equipment should also be hygienically designed and well maintained so that it does not become the source of *Listeria* contamination. Make sure tools are not re-used somewhere else which will only help the spreading, that all tools are cleaned and disinfected after use, and stored off the floor.

f. Reinforcing personal hygiene practices

Personnel need to be trained in correct hand washing procedures, with the potential for cross contamination clearly explained. The use of validated hand soaps and disinfectants, or one step products such as Soft Care Bac or Sensisept is essential. Hand washing before entry into a food handling area should be mandatory. Visual aids help to remind and reinforce the procedure. Clothing, including footwear and aprons, should be washed at high temperature or disinfected to reduce the potential of *Listeria* transfer.

g. Maintaining chillers and evaporators

Chillers and evaporators provide the ideal environment for *Listeria* growth as they are cold and wet. Any condensate should be directed to drains via pipe work and product should not be stored underneath.





“The proactive *Listeria* management approach: Prevention, Intervention, and Control”

h. Managing floors and drains

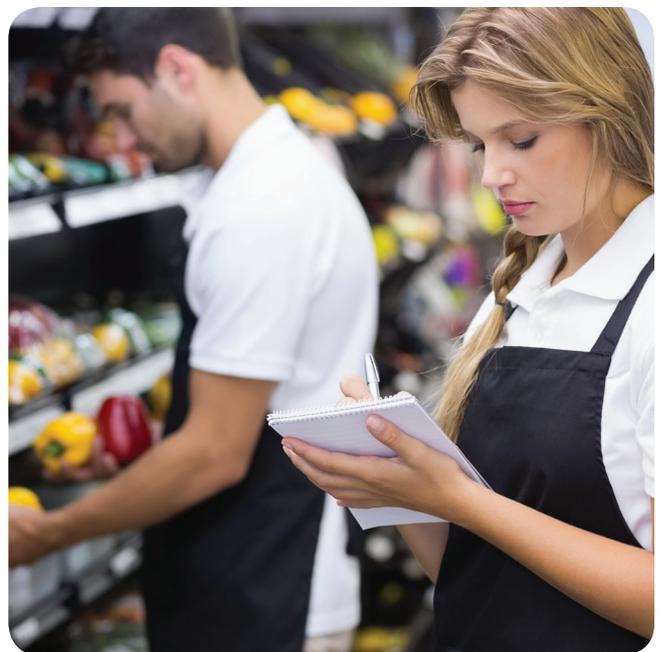
Water is one of the main vectors for spreading *Listeria*. Therefore it is critical to keep the environment as dry as possible. Floors and drains have a constant supply of water and food debris making them an ideal environment for *Listeria* to thrive. Good hygienic practices, including not placing food contact equipment or trolleys over drains, avoiding directing water jets into drains (aerosols!), squeegeeing the floors regularly to prevent pooling will help to reduce the potential for growth and cross contamination. Note that squeegees themselves can be contaminated. Single blade hard rubber ones are better than those with foam blades.

Please refer to section 6 for recommended disinfectants from the Diversey range.

The most effective cleaners or cleaner/disinfectants are chlorinated alkali such as Suma Chlorsan D10.4, Hypofoam VF6, Endurosafe and Divosan Plus. Alternatively, use quat based cleaner/disinfectants such as Suma Bac D10, or combinations of floor cleaners with final disinfection for example Hypochlorite V3 or a chlorine solution of Suma Tab D4.

i. Mapping *Listeria* in the facility

To control *Listeria* you need to know where it occurs. You should consider the flow of people and materials to prevent potential spreading. Environmental swabbing and making a map of the results will further help you to track and trace possible *Listeria* sources. Microbiological analyses of specific strains can be used to identify environmental strains and the source of contamination.



6. Standard Procedures

The processes that must be taken to restore the processing environment to the hygienic conditions required prior to resuming processing.

Action	Product Name ¹	Characteristic	Application ²	Certification ^{3,4}
General Purpose Cleaning	Hypofoam VF6	Chlorinated, Caustic, thixo-foam	Spray or bucket use at stated concentration	N/A
	Endurosafe	Chlorinated, alkaline cleaner		
	Suma Break Up SC D3.5	Alkaline Cleaner		
	Enduro Plus	Chlorinated, caustic, thixo-foam		
	Enduro Chlor	Chlorinated, caustic, thixo-foam		
	Suma Total D2.4	Neutral All Purpose		
	Suma Extend D3	Aluminium Safe HD Degreaser		
	Suma Multi D2	Alkaline Cleaner		
	Suma Break Up Chlor D3.4	Chlorinated Caustic, thixo-foam		
	Suma Bio Floor	Bio Active, No Rinse Floor Cleaner		
	Suma Drain GTS	Bio Active Drain Cleaner	Autom. Dosing	
Final step Sanitizing & Disinfection	Suma Tab D4	Chlorine based	Soak or bucket use at stated concentration	EN1276, EN1650, EN13697, EN13727, EN13624, EN14348, EN14476: 2013+A1:2015
	Divosan Hypochlorite VT3	Chlorine based	Sprayed at stated concentration	EN1276, EN1650, EN13697
	Divosan Plus	Peracetic acid based		EPA 70627-53
	Suma Alcohol Spray	Ethanol based		EN1276, EN1650, EN13697, EN16777, EN13624, EN13727
	J-512	QAC based		EPA 70627-63
	Diverfoam Active VT70	Peracetic acid based		EN1276, EN1650, EN13697, EN13704
	Delladet	QAC based		EN1276, EN1650, EN13697
Combined Cleaning & Sanitation/ Disinfection	Suma Chlorsan D10.4	Chlorinated, alkaline based	Sprayed at stated concentration	EN1276, EN1650, EN13697, EN13704, EN 14348, EN13727, EN13624, EN13704, EN14476: 2013+A1:2015, prEN16777
	FSD-34	Anionic, isopropanol, acid based		EPA 875-184
	Suma Bac D10	QAC based		EN1276, EN1650, EN13697
Anti microbial hand washing	Soft Care Bac	Triclosan based	Soap dispenser ready-to-use	
	Soft Care Sentry	Benzalkonium Chloride based		NSF E2
	Soft Care Defend	Chloroxylenol based		NSF E2
	Soft Care Med	Isopropyl / n-propanol alcohol based		EN1275, EN1650, EN1276, EN13624, EN14476, EN14348, EN13727, EN1500, EN12791
	Soft Care Sensisept	2 in 1 Soap and Disinfectant / Chlorhexidine Digluconate based		EN1650, EN1276, EN1499, EN13624, EN13727, EN14476

1) Not all products may be available in all countries

2) Always check SDS and product label for correct handling and use concentration

3) EN approved disinfectants show bactericidal activity which is also effective against *Listeria monocytogenes*

4) EPA products Divosan Plus, J-512 and FSD-34 are tested against *Listeria monocytogenes*.



7. Key points

1. Keep the facility and equipment clean

- Always wash and sanitize surfaces, equipment and utensils after handling uncooked food. (don't forget can-openers, graters, slicers, fillers)
- Always keep fridges and freezers clean. *Listeria* can grow in cold conditions.
- Clean walls and floors in chillers. Also clean drip-trays underneath fans.
- *Listeria* loves drains. Clean drains regularly with hot-water and chemicals.
- *Listeria* loves standing water, so make sure to always dry any spillages on floors.

2. Apply recommended Cleaning & Hygiene procedures

- Use the recommended chemicals at the correct dosage.
- When cleaning, try to use water with a higher temperature.
- Make sure tools are not re-used somewhere else, and that all tools are cleaned and disinfected after use

3. Apply strict personal hygiene practices

- Wash and disinfect hands regularly, and when moving from one area to another.
- Wear clean clothes and shoes

4. Handle food properly

- Always separate cooked and uncooked food
- Use pasteurized milk and cheeses. *Listeria* is often detected in raw dairy products.
- Also take care in using processed meats like ham, salami, and poultry.

5. Store foods properly

- Cover food properly.
- Don't store Ready-To-Eat food beyond the use-by-date.

References:

“Controlling *Listeria monocytogenes* in a Retail Setting”; Food Protection Trends, Vol. 27, No. 1, Pages 22–28; Dr. Dale A. Grinstead (JohnsonDiversey) and Dr. Catherine N. Cutter (Pennsylvania State University).

“Dealing with *Listeria* - A guide for Food Manufacturers”, Dr. Cath Rees and Dr. Cristine Dodd, University of Nottingham, Developed in association with Diversey.



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