

## FACTSHEET

### LISTERIA (*Listeria monocytogenes*)

#### WHAT ARE LISTERIA

Listeria are small rod-shaped bacteria that are widespread in nature. The genus *Listeria* includes 6 different species whereat *Listeria monocytogenes* as causative pathogenic germ for humans bears the biggest importance.

Listerial growth can occur at temperatures between 0 and 44 °C, therefore they can grow in a fridge. *Listeria* can grow with or without oxygen which means that vacuum packaging provides no protection. Due to the heat sensitivity of *Listeria*, especially unheated raw products are at risk. The natural habitat of *Listeria* is soil and surface water, not air. However, during cleaning processes with pressurized water vapor, germs are rising in the air and spread across the whole food production.



pic 1<sup>3</sup>: *Listeria monocytogenes*

#### HEALTH RISKS

*Listeria* infection causes quite different acute and chronic diseases including suppuration of meninges, swellings in the brain, in liver and spleen as well as other organs. Diseases caused by *Listeria* are called listeriosis.

Persons with a weak immune system such as elderly people, infants or pregnant women are particularly at danger. Pregnant women infected with *Listeria* often exhibit symptoms of a slight influenza. However, *Listeria* can infect the fetus and cause preterm birth or even miscarriage.

#### TRANSMISSION OF THE INFECTION

*Listeria* are present in many foods that are either not heat treated or are secondary contaminated by germ-infested pipes, soil or germ containing washing water. Especially fresh cut salads, raw-milk cheese, raw meat and raw meat products as well as fish are affected.

The pathogen can enter the human body by means of contaminated food via the gastrointestinal passage. Besides, *Listeria* are invasive and can enter the human body directly by invasion in skin and eyes. This invasive characteristic enables *Listeria* to infect the fetus during pregnancy.



#### PREVENTIVE COURSE OF ACTION

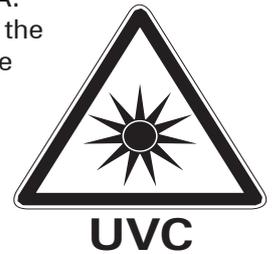
As *Listeria* are heat sensitive, heating of food is appropriate to inactivate the microorganisms. However, in many cases heating is not desired or possible, besides, heating does not prevent secondary contamination caused by contaminated surfaces or liquids. An extensive hygienic concept during the production of food is essential to prevent contamination with *Listeria*.

UVC technology provides an effective option of microorganisms inactivation on surfaces, in liquids or even air. Due to their cell structure, *Listeria* hold no specific protection mechanisms against UVC which results in a reduction of 99.9 % when 2.99 mJ/cm<sup>2</sup> are applied (Kowalski 2009).

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By means of UVC technology, photochemical reactions take place at the microorganism DNA. Parts of the DNA break open and especially thymine forms dimers, therefore a replication of the DNA is not possible anymore. Without DNA replication, cell number can not increase and the organismseventually die. As *Listeria* grow preferred on humid surfaces, they can often be detected on cooler coils. Two approaches to solve this problem exist, they can either be applied singularly or, within the framework of a hygienic concept, in combination. One approach includes direct decontamination of cooler coils by means of a modular sterilAir ET-system. However, cleaning of coils with high pressure spray nozzles leads to spreading of vapor containing *Listeria* and therefore to spreading of *Listeria* in the air. Application of an UVR to decontaminate the air can drastically reduce the amount of microorganisms in the air and complement the hygienic concept. For the decontamination of surfaces, especially for the decontamination of flat conveyors, hygienic design of the installation is of major importance for the daily routine during production. The belt sterilization system T2018 was developed in cooperation with industry partners and comprehensively tested. With its hygienic design, the T2018 provides an optimized solution for belt sterilization, independent of the width of the belt. Easy assembly and cleaning bring this sterilization solution down to a round figure.



pic 2<sup>3</sup>: sterilAir UVR-4K Air disinfection unit in a vegetable storage room



pic 3<sup>3</sup>: sterilAir ET-Modular System in front of a evaporator

The advantage of UVC decontamination with a specialist like sterilAir is based on our approach to solving a contamination problem: First, the origin of the listeria contamination is clarified. Second, the most easy and efficient inactivation solution is determined.

Therefore different options exist. With more than 75 years of experience, sterilAir possesses extensive experience and Know-How to provide tailor-made answers to surface contaminations (e.g. slicer and conveyor belts), liquid contaminations (e.g. brine and washing water) or air for our customers.

#### INDICATION OF SOURCE

Krämer, J. (2002): Lebensmittel-Mikrobiologie. 4., neu bearb. Aufl. Stuttgart: Ulmer (UTB für Wissenschaft Uni-Taschenbücher, 1421).

«Robert Koch Institut – Listeriose» [https://www.rki.de/DE/Content/Infekt/EpidBull/Merkblaetter/Ratgeber\\_Listeriose.html](https://www.rki.de/DE/Content/Infekt/EpidBull/Merkblaetter/Ratgeber_Listeriose.html), 20.07.2018

Kowalski, W. J. (2009): Ultraviolet germicidal irradiation handbook. UVGI for air and surface disinfection. Heidelberg, New York: Springer-Verlag.