

## Industrial and Food Microbiology and Biotechnology

# FOOD AND CLINICAL STRAINS OF *LISTERIA MONOCYTOGENES*: THE QUEST FOR DISTINCTION

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*Listeria monocytogenes* is one of the most feared foodborne pathogens; most frequent cause of death due from contaminated food in Europe (2008-2015); one of the highest mortalities of all bacteria (> 17%). In addition to suffering, functional disability and death, *L. monocytogenes* and listeriosis have a huge economic impact. Not only the health systems but also the food industry are severely affected. Food recalls, frequently result in the destruction of high amounts of foods – food waste and direct economic loss – brand damage and loss sales, litigation costs, etc. It is tightly controlled by regulators and companies and represents a serious barrier to the entry of a number of food products, both through official controls and by the requirements of commercial chains. Many countries, such as the USA and Russia, have a zero tolerance for the presence of *L. monocytogenes* i.e. if the organism is detected within a product, then it must be recalled, whereas current legislation in the EU state that *L. monocytogenes* cannot be present in a ready-to-eat product at levels above 100 cfu/g at the time of consumption. About 25 years ago, a group of researchers raised the following question: "Is any strain of *Listeria monocytogenes* detected in food a health risk?". Despite all the research developments since then, science still does not have a conclusive answer to this question and current legislation does differentiate between different strains of *L. monocytogenes*, lumping all strains together as a single group of pathogenic organisms. There is no doubt that the food industry craves for methodologies that can provide a reliable distinction between pathogenic from non pathogenic strains. However, this is complicated since the severity of disease i.e. virulence, is linked to individual immunity and certain people are more likely to contract listeriosis than others. Moreover it is now recognised that exposure to environmental stresses such as those encountered in foods (e.g. low pH, low temperature, high NaCl concentration) may influence the virulence expression of *L. monocytogenes*. Nevertheless the use of whole genomic sequencing and different omics approaches will in time enable the development of greater knowledge that can be useful to take a much more nuanced approach to dealing with *L. monocytogenes*, and ultimately limit the number of listeriosis outbreaks.