

Influence of the persistence of *Listeria monocytogenes* on the susceptibility to bacteriocins

Joana Barbosa¹, Teresa Bento de Carvalho¹, Luís Soares¹, Vânia Ferreira¹, Rui Magalhães¹, Manuela Vaz Velho², Paula Teixeira¹

¹. UCP - CBQF, Universidade Católica Portuguesa - CBQF, Rua de Diogo Botelho 1327, 4169-005, Porto, Portugal;

². IPVC-CISAS, Instituto Politécnico de Viana do Castelo - CISAS, Rua Escola Industrial e Comercial Nun'Álvares, 34 Viana do Castelo, Portugal;

Listeria monocytogenes is a widespread microorganism that causes listeriosis, a serious disease in humans resulting from the consumption of contaminated food. While it can affect healthy individuals, listeriosis primarily impacts the elderly, immunocompromised individuals, pregnant women, and newborns, with a high case fatality rate (20%–30%) (Magalhães et al., 2023). Effective elimination of this pathogen is challenging due to its ability to form biofilms and resist conventional sanitisation measures. Within the food processing environment, *L. monocytogenes* strains can be classified as persistent (colonising industrial surfaces for long periods of time, even after successive cleaning and disinfection procedures) or non-persistent (detected sporadically and tending to be more easily eliminated) (Ferreira et. a al., 2014). The presence of persistent strains in the food industry represents an increased risk as they can act as continuous reservoirs of contamination, making it essential to develop more effective control strategies.

A promising approach to controlling *L. monocytogenes* is the use of bacteriocins, antimicrobial peptides produced by some microorganisms, such as lactic acid bacteria (LAB). Despite the proven efficacy of some bacteriocins against *L. monocytogenes*, it is still unclear whether the persistence of certain strains influences their sensitivity to these antimicrobial substances.

Therefore, this study aims to evaluate the action of different bacteriocins against persistent and non-persistent strains of *L. monocytogenes*, to understand whether there is a relationship between persistence capacity and resistance to these substances.

Antimicrobial activity (expressed as arbitrary units (AU) per mL) of semi-purified bacteriocins of six LAB strains (*Lactiplantibacillus plantarum* R23; *Pediococcus pentosaceus* K34; *P. pentosaceus* SB83; *P. pentosaceus* DT016; *Pediococcus acidilactici* HA-6111-2 and *Leuconostoc lactis* RK18) against 32 *L. monocytogenes* strains from fermented meat products (15 non-persistent and 17 persistent) was determined. With the exception of *L. lactis* RK18 (with inhibitions between 200 and 6400 AU/mL), all bacteriocins produced by the remaining LAB showed excellent anti-listerial activity (between 3200 and 12800 AU/mL). However, there was no evidence of a clear relationship between the persistence of *L. monocytogenes* and its susceptibility to the bacteriocins tested. Although some strains showed distinct resistance profiles, the data obtained do not allow the conclusion that the ability to persist is directly related to the greater or lesser efficacy of the bacteriocins.

Further research is needed to clarify the relationship explored in this preliminary study. Studies with a larger number of strains and different bacteriocins or even evaluating the efficacy of bacteriocins against *L. monocytogenes* strains subjected to stress conditions simulating industrial environments could contribute to a more in-depth understanding.

References

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