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Effect of several antimicrobial agents upon the survival of *Listeria monocytogenes* strains

A.J. Pedrosa, V.R. Barbosa, J. Silva, P. Teixeira

Centro de Biotecnologia e Química Fina, Escola Superior de Biotecnologia, Universidade Católica Portuguesa

Rua Dr. António Bernardino Almeida, P-4200-072 Porto, Portugal

INTRODUCTION

Listeria monocytogenes is a widely distributed pathogenic bacterium, responsible for outbreaks of listeriosis in humans and animals. Their ability to form biofilms on different types of food-processing surfaces may potentially lead to food product contamination. In order to eliminate *L. monocytogenes* from the processing surfaces, several sanitizing agents are commercially available. However, the mishandling of these agents regarding the concentration, time and temperature of exposure may lead to the regular exposure of the contaminants to sub-lethal conditions in hard to reach places and consequently to the emergence of persistent strains that are difficult to eradicate.

The aim of the present study was: i) to evaluate the viability of two strains of *L. monocytogenes* (a persistant and a ocasional strain from a food processing cheese plant) through the exposure to three commercial antimicrobial agents and ii) to study the capacity of these strains to produce biofilms.

MATERIALS AND METHODS

Two *L. monocytogenes* strains, isolated from a cheese processing plant, were selected for this study: a persistent and a non-persistent one.

Minimum inhibitory concentrations (MIC) for the three commercially available detergents (Betelene-F3, bleach and Topax 66) were determined according to the CLSI (2009).

The antimicrobial efficacy of the detergents, in suspension and in the biofilms, was evaluated, according to Stepanovic et al. (2003).

RESULTS

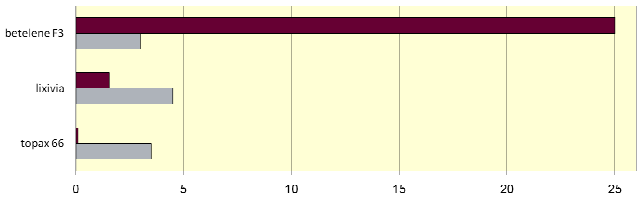

Figure 1. Minimal inhibitory concentration (%) values for both *L. monocytogenes* strains.

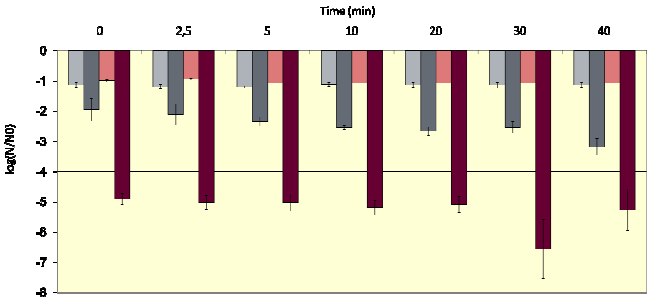

Figure 2. Inactivation of persistent and non-persistent *L. monocytogenes* strains, when exposed to the minimal inhibitory concentration of *betelene-F3*

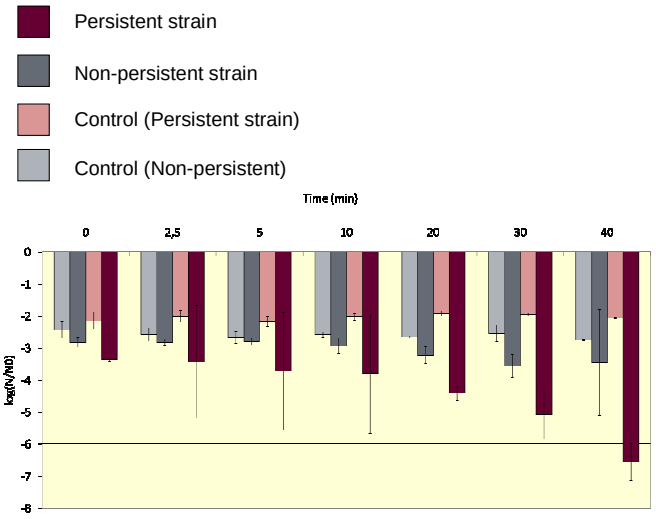

Figure 3. Inactivation of persistent and non-persistent *L. monocytogenes* strains, when exposed to the minimal inhibitory concentration of bleach.

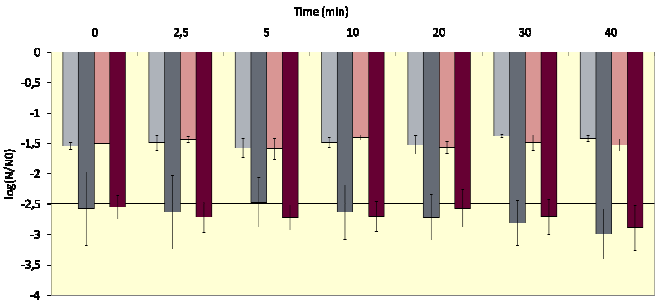

Figure 4. Inactivation of persistent and non-persistent *L. monocytogenes* strains, when exposed to the minimal inhibitory concentration of *topax-66.*

CONCLUSIONS

Both strains showed similar MIC values to the three detergents tested. Concerning the inactivation of the cellular suspensions, there was a significant difference between both strains, when using Betelene-F3 and bleach, being the persistent strain more affected by these detergents than the non-persistent strain. No significant difference was observed concerning biofilm formation between the two strains. Thus the results suggest that the persistence of *L. monocytogenes,* in food industry, can not be, solely, justified by its resistance to detergents and biofilm production.

REFERENCES

•Clinical and Laboratory Standards Institute (CLSI), 2009. Performance Standards for Antimicrobial Susceptibility Tests; Approved Standard — V 27, No 1 (M100-S17). Clinical and Laboratory Standards Institute, Wayne, PA.

• Stepanovic, S., Vukovic, D., Dakic. I, Savic, S.and Svabic-Vlahovic, M., A modified microtiter-plate test for quantification of staphylococcal biofilm formation *Journal of Microbiological Methods, 40 175– 179* (2003).

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