

Evaluation of Bacteriocinogenic Lactic Acid Bacteria Isolated from Traditional Portuguese Sausages that Might Be Used as Potential Bioprotective Starter Culture

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Introduction

Traditional Portuguese fermented meat sausages are part of a daily diet in the Northern regions of Portugal. *Alheiras* are one of the multiple types of these products and they are normally produced using pork meat, pork lard, poultry, wheat bread and olive oil mixed with salt, garlic and spices. As raw meats are frequently contaminated with several bacteria, *Alheiras* were found to be often contaminated with *Listeria monocytogenes* (Ferreira *et al.* 2006, 2007). In this study a new type of product was used – *Alheira de Vitela* – made with veal meat, poultry, wheat bread and olive oil mixed with salt and spices, where the same pathogen was previously found in some samples. Therefore, the objective of this work was to evaluate the ability of a bacteriocinogenic LAB, *Pediococcus acidilactici* HA-6111-2 previously isolated from a traditional *Alheira* (Albano *et al.* 2007), to inhibit/reduce the growth of *L. monocytogenes* during storage and shelf life of *Alheira de Vitela*.

Methods

25g of *Alheira de Vitela*'s paste (mass after the mixture of all the ingredients, but before filling and smoking processes) was first sterilized at 121 °C for 15 minutes and then inoculated with *P. acidilactici* HA-6111-2 (10^7 CFU/g) and a strain of *L. monocytogenes* (10^4 CFU/g) isolated from traditional Portuguese fermented sausages. As controls, a paste with only *P. acidilactici* HA-6111-2 (10^7 CFU/g), another one inoculated with only the same strain of *L. monocytogenes* (10^4 CFU/g), and a last one inoculated with a non-bacteriocinogenic LAB strain and the pathogen in the same concentrations were used. Pastes were stored at 4 °C (recommended storage temperature of the final product). Three replicate samples of 1g were taken during 10 days and analyzed for the growth of the inoculated bacteria:

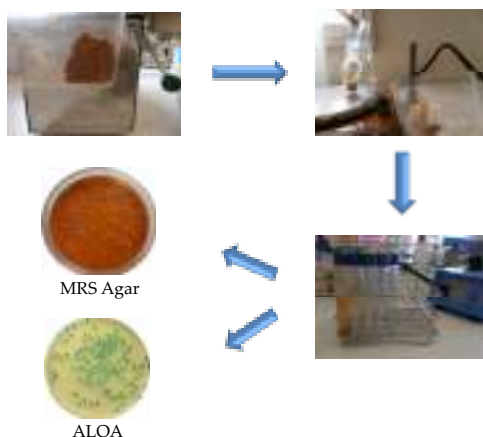


Figure 1. Materials and methods.

Results and Discussion

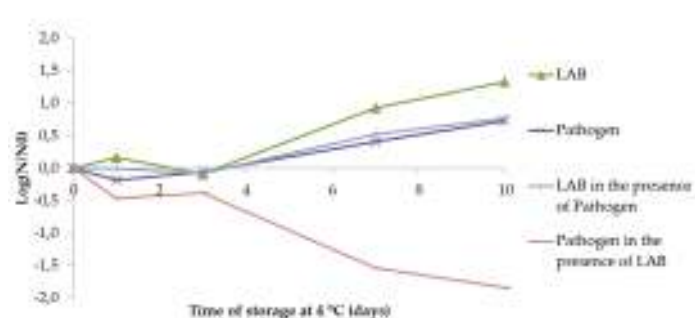


Figure 2. Effect of *P. acidilactici* HA-6111-2 on the growth of *L. monocytogenes* in paste of *Alheira*.

The results showed that *P. acidilactici* HA-6111-2 and the pathogen can grow in paste of *Alheira* and the appearance of the paste is not changed by neither the presence of the LAB, nor the pathogen. On the other hand, figure 2 shows that LAB's grow is not affected by the presence of *L. monocytogenes*, but *L. monocytogenes* population was reduced below the detection limit of the method used ($3 \log$ CFU/g) when inoculated with the bacteriocinogenic culture ("Pathogen in the presence of LAB" in fig. 2). In the presence of the non-bacteriocinogenic LAB strain, *L. monocytogenes* had the same behavior as when it was alone in the paste (data not shown).

This study allows to conclude that bacteriocinogenic *P. acidilactici* HA-6111-2 is a potential strain to be used as a biocontrol agent in *Alheira de Vitela*.

References

- Albano, H., Todorov, S. D., van Reenen, C. A., Hogg, T., Dicks, L. M. T., Teixeira, P. (2007). "Characterization of two bacteriocins produced by *Pediococcus acidilactici* isolated from "Alheira", a fermented sausage traditionally produced in Portugal". *Int. J. Food Microbiol.* **116**: 239–247;
- Ferreira, V., Barbosa, J., Vendeiro, S., Mota, A., Silva, F., Monteiro, M. J., Hogg, T., Gibbs, P., Teixeira, P. (2006). "Chemical and microbiological characterization of *alheira*: A typical Portuguese fermented sausage with particular reference to factors relating to food safety". *Meat Science* **73**: 570 – 575;
- Ferreira, V., Barbosa, J., Silva, J., Felício, M. T., Mena, C., Hogg, T., Gibbs, P., Teixeira, P. (2007). "Characterisation of *alheiras*, traditional sausages produced in the North of Portugal, with respect to their microbiological safety". *Food Control* **18**: 436–440.

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