

Potential of bacteriocinogenic cultures on the biopreservation of soils

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Introduction

The agricultural practices influence soil microbiota and contribute to the presence of foodborne pathogens on soils. Therefore, soil is a potential source of vegetable contamination, which can lead to foodborne diseases, especially due to the consumption of ready-to-eat products. [1]

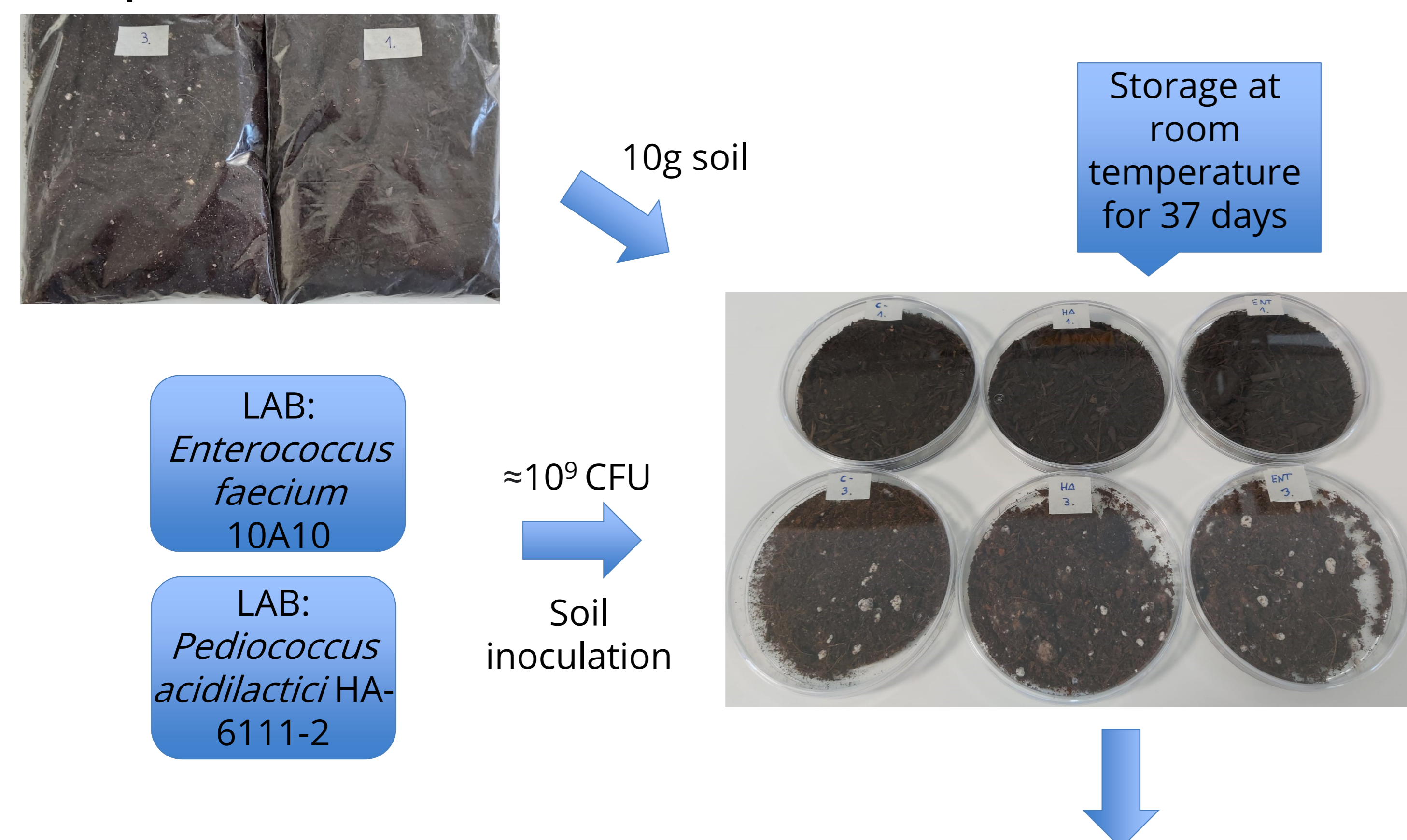
In 2014 an outbreak of listeriosis was reported in Switzerland and 31 cases were confirmed after eating ready-to-eat salad contaminated with *Listeria monocytogenes*. [2] In 2018, another outbreak of *L. monocytogenes* related to the consumption of frozen vegetables affected 47 people and nine died. [3]

With the purpose of reducing these risks, the use of lactic acid bacteria (LAB) as biocontrol agents emerges as a potential alternative to the use of other practices with negative environmental impact.

Some studies have demonstrated the antimicrobial activity of LAB against foodborne pathogens, in particular *L. monocytogenes*. [4;5]

Methods

1. Preparation of LAB cultures and inoculation into the soil



2. LAB enumeration

References

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- [3] European Food Safety Authority, & European Centre for Disease Prevention and Control. (2018). Multi-country outbreak of *Listeria monocytogenes* serogroup IV B, multi-locus sequence type 6, infections linked to frozen corn and possibly to other frozen vegetables—first update (Vol. 15, No. 7, p. 1448E).
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- [5] Albano, H., Todorov, S. D., van Reenen, C. A., Hogg, T., Dicks, L. M., & Teixeira, P. (2007). Characterization of two bacteriocins produced by *Pediococcus acidilactici* isolated from "Alheira", a fermented sausage traditionally produced in Portugal. *International Journal of Food Microbiology*, 116(2), 239-247.

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Acknowledgements

Objectives

The main purpose of this work was to evaluate the survival of two bacteriocin-producing lactic acid bacteria in two different organic soil amendments.

Results

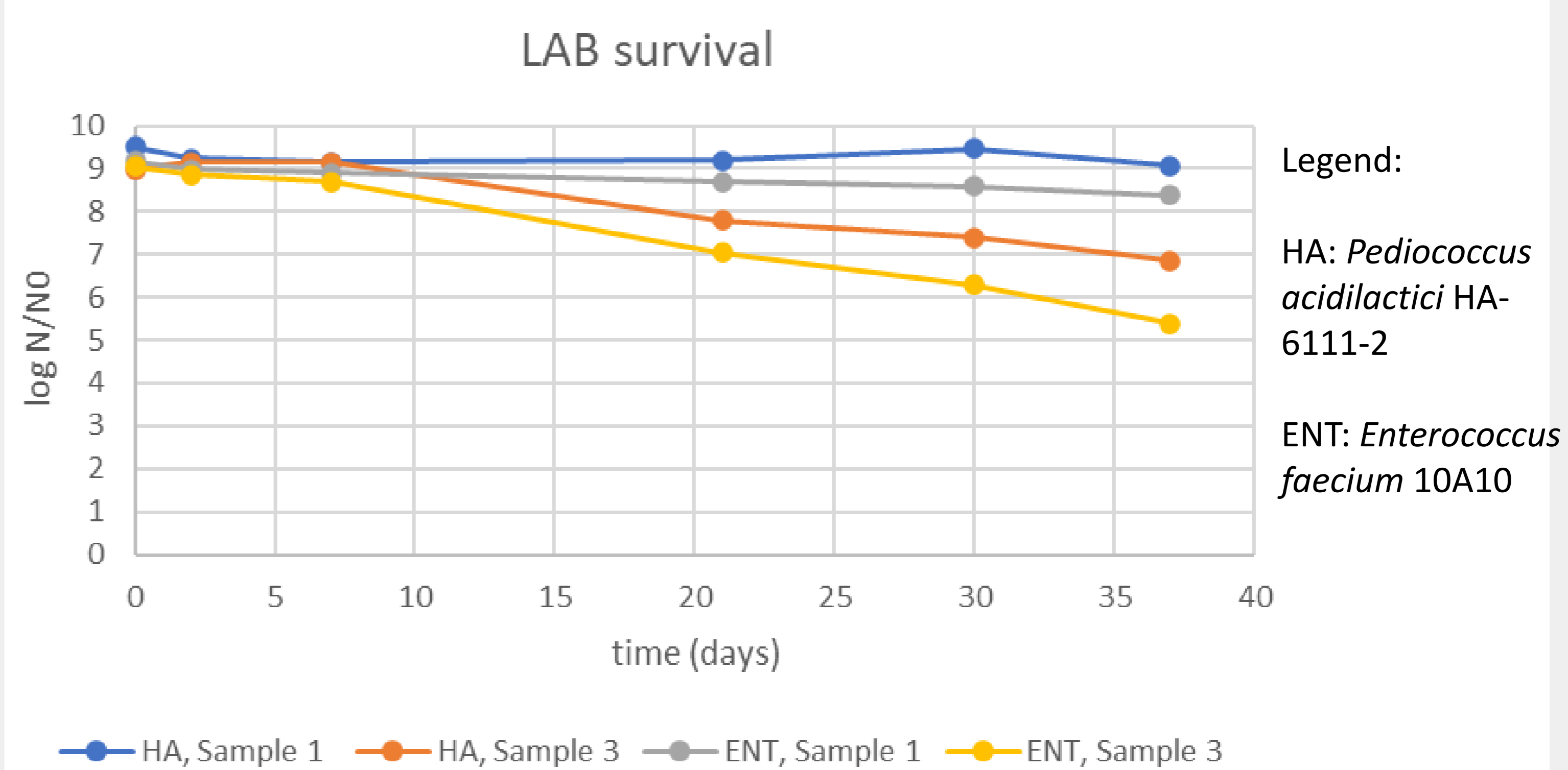


Figure 1. Survival of two LAB in two different soil amendments (sample 1 and 3)

Conclusions

No significant differences were observed in the numbers of *P. acidilactici* and *E. faecium* in sample 1 at day zero and day 37 ($p > 0.05$). However, significant reductions of about 2 and 4 log cycles occurred in sample 3 for *P. acidilactici* and *E. faecium*, respectively. No LAB were found in control samples.

Despite being preliminary, these results point to the survival of bacteriocinogenic LAB in two different soil amendments. Although their composition seems to have an effect on this survival, the high numbers found after one month indicate the potential of these bacteria to control foodborne pathogens in contaminated soils.