

# Behavior of foodborne pathogens in soils incorporating lactic acid bacteria

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## Introduction

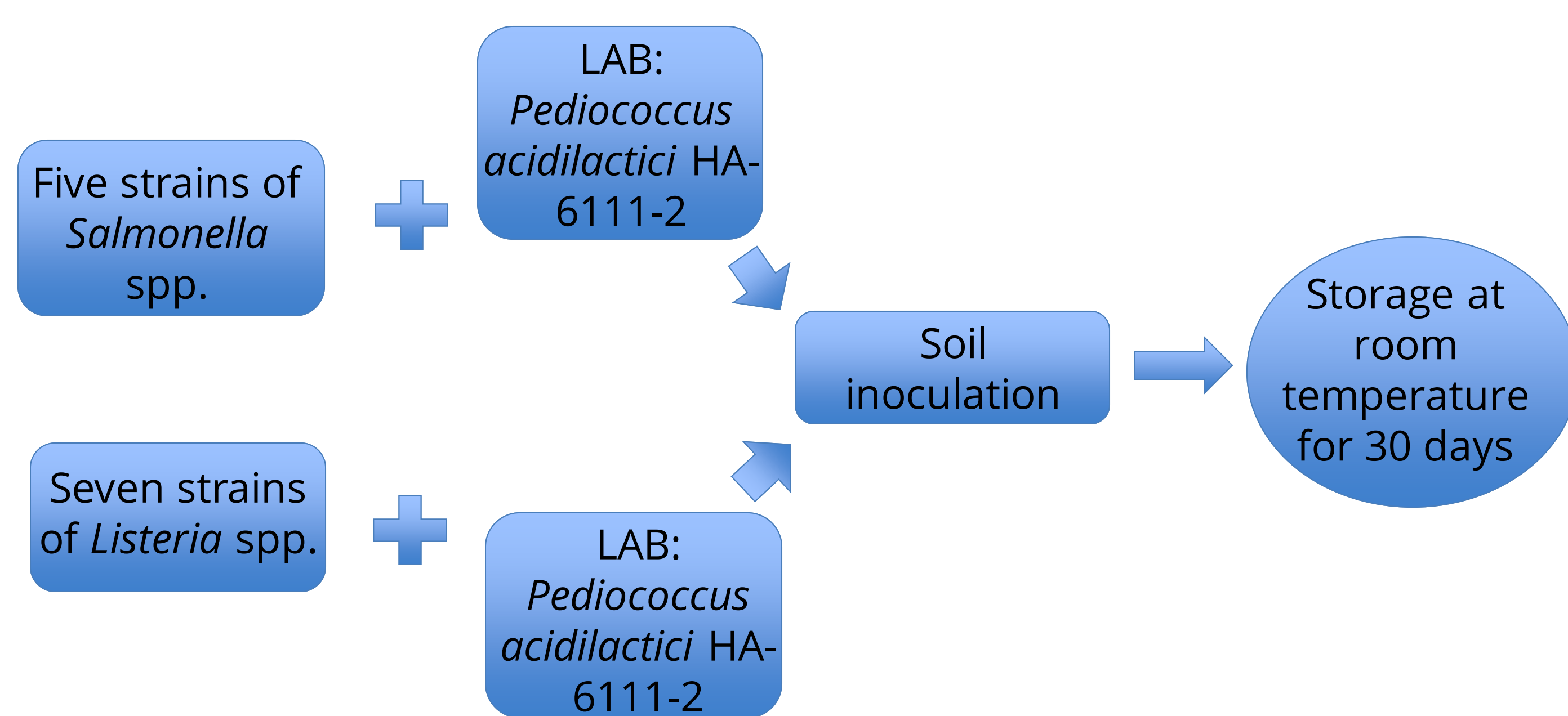
Foodborne pathogens can be introduced into the soil through various sources of contamination: the use of animal faecal matter as fertilizer, irrigation water, poor agricultural practices or naturally occurring. The ability of these microorganisms to survive in manure used as fertilizer and potentially in the soil is a threat to the safety of agricultural products. [1]

Subsequently, vegetables and fruits grown on these soils can become a source of contamination. This can lead to serious health problems for consumers, especially as they are ready-to-eat products. [2]

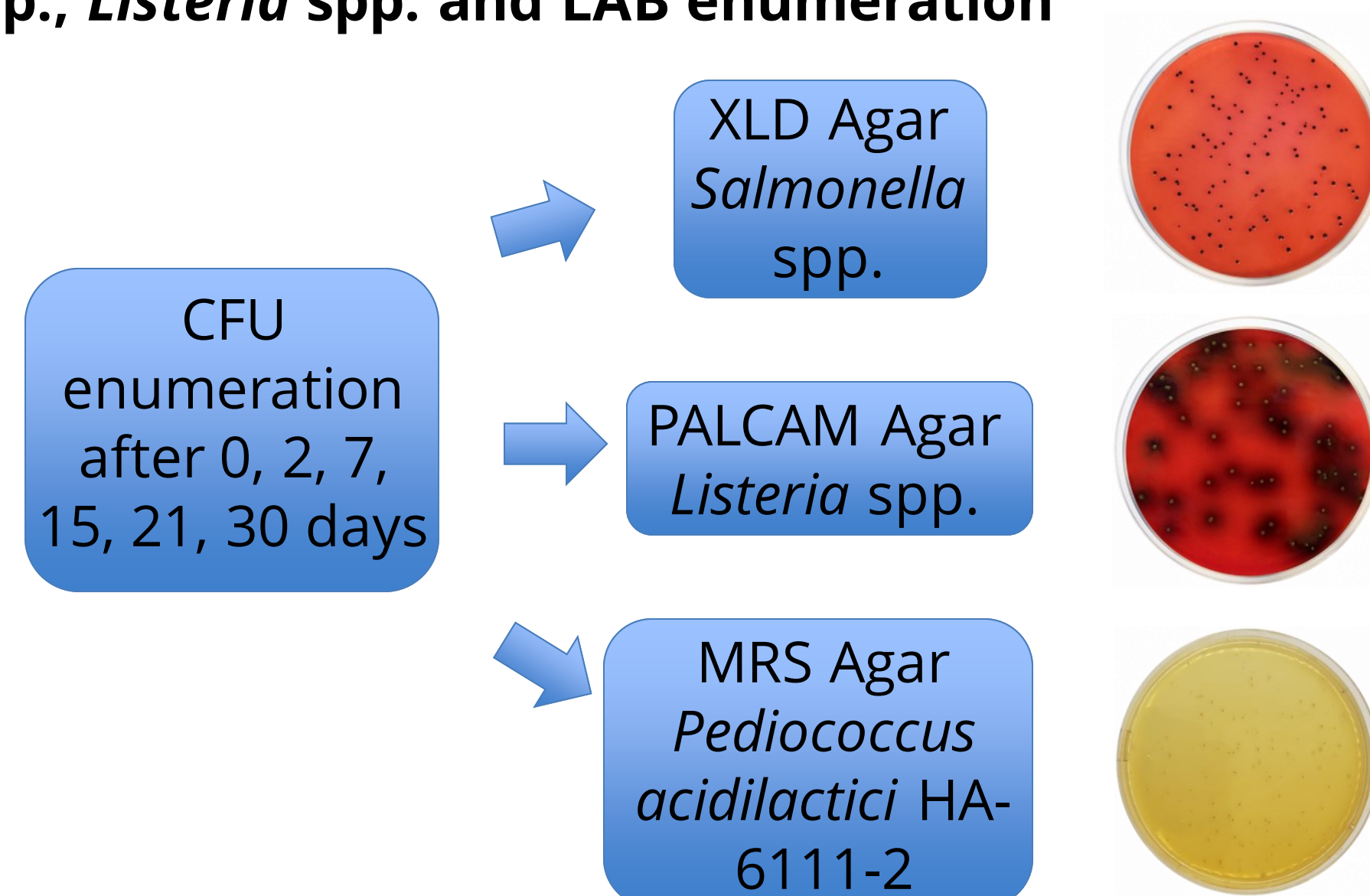
In an attempt to minimize these problems, some studies incorporating lactic acid bacteria (LAB)-producing bacteriocins against pathogens have been reported. [3;4]

## Methods

### 1. Preparation of pathogen cocktails and inoculation into the soil



### 2. Salmonella spp., Listeria spp. and LAB enumeration



## Objectives

The main purpose of this work was to evaluate the action of a bacteriocin-producing lactic acid bacteria against two foodborne pathogens in organic soil amendments.

## Results

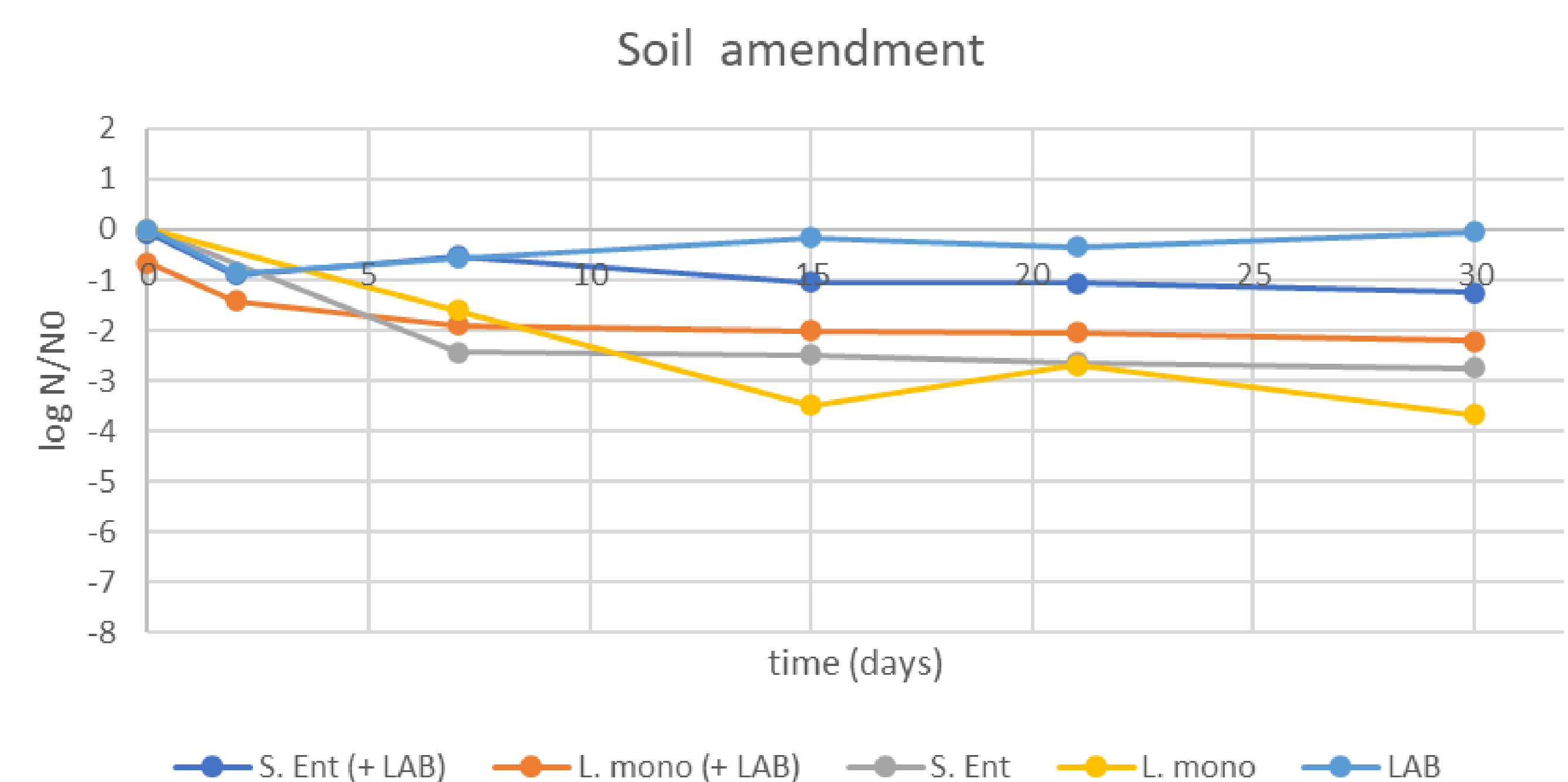


Figure 1. Interaction between LAB and foodborne pathogens in soil amendment

## Conclusions

- After 30 days of storage, it was found that *Pedococcus acidilactici* HA-6111-2 had the ability to survive in the soil amendment tested. The same behaviour was not observed for both *Salmonella* Enteritidis and *Listeria monocytogenes* strains, with reductions higher than 2 and 3 log cycles, respectively, in the soil amendment with no LAB incorporated.
- Additionally, *S. Enteritidis* and *L. monocytogenes* were only reduced by 1 and 2 log cycles, respectively, when stored in soil amendments with LAB. Apparently, bacteriocinogenic *P. acidilactici* HA-6111-2 seemed to confer protection to these foodborne pathogens.
- Although no inhibitory activity of LAB was found against both foodborne pathogens in soil amendment, the survival of *P. acidilactici* HA-6111-2 in the sample is a promising result. Further studies should be conducted to harness its potential as a biocontrol agent.

## References

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- [4] Bigwood, T., Hudson, J. A., Cooney, J., McIntyre, L., Billington, C., Heinemann, J. A., & Wall, F. (2012). Inhibition of *Listeria monocytogenes* by *Enterococcus mundtii* isolated from soil. *Food microbiology*, 32(2), 354-360

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