

# Probiotic properties of lactic acid bacteria isolated from fermented foods

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## Introduction and Objective

Probiotic microorganisms are mainly ingested by the consumption of fermented foods.<sup>[1]</sup> Lactic acid bacteria can be isolated from this kind of products and are recognized as being part of human and animal microbiome, where they play a sophisticated and crucial balance between health and disease.<sup>[2]</sup> They are considered the major group of probiotic bacteria being *Lactobacillus*, *Enterococcus*, *Streptococcus* and *Leuconostoc* the most commonly genera used.<sup>[2,3]</sup> Their use in food products is very attractive, especially if they could also inhibit important foodborne pathogens. In general, for commercial purposes, and depending on the product, potential probiotics that are species and strain dependent should meet a number of requirements, as being safe, functional, beneficial and with technological and physiological properties.<sup>[1]</sup> The aim of this study was to evaluate the probiotic potential of three lactic acid bacteria isolated from different fermented products.

## Results

### A. Safety criteria of potential isolates

Results obtained for the evaluation of safety criteria are shown in Table 1.

Table 1. Results of the safety criteria for the 3 bacteriocinogenic cultures

	<i>E. faecium</i> RS7	<i>E. faecium</i> P12	<i>Ln. Lactis</i> RK18
Gelatinase	-	-	-
DNase	-	-	-
Haemolysis	γ	γ	γ
Biogenic amines	positive reaction for tyramine		none BA produced
Presence of virulence genes	presence of <i>efaAfm</i> , <i>asa1</i> , <i>hdc1</i> , <i>odc</i> and <i>tdc</i>		presence of <i>asa1</i>
Susceptibility to antibiotics	susceptible only to gentamicin and vancomycin		sensitive to all except for vancomycin

Only *Ln. lactis* RK18 was considered safe and selected for further tests since:

- Did not show any of the virulence factors tested (presence of haemolysis, production of hydrolytic enzymes DNase and gelatinase and production of biogenic amines)
- Did not present virulence genes with exception of *asa1* gene (aggregation substance protein)
- It was also susceptible to all antibiotics recommended by European Food Safety Authority (EFSA).<sup>[4]</sup>

### B. Resistance of *Ln. lactis* RK18 to acidic conditions and bile salts during 4h and through a simulated GIT conditions incorporated in a fermented food matrix and its ability to adhere human colon adenocarcinoma cells

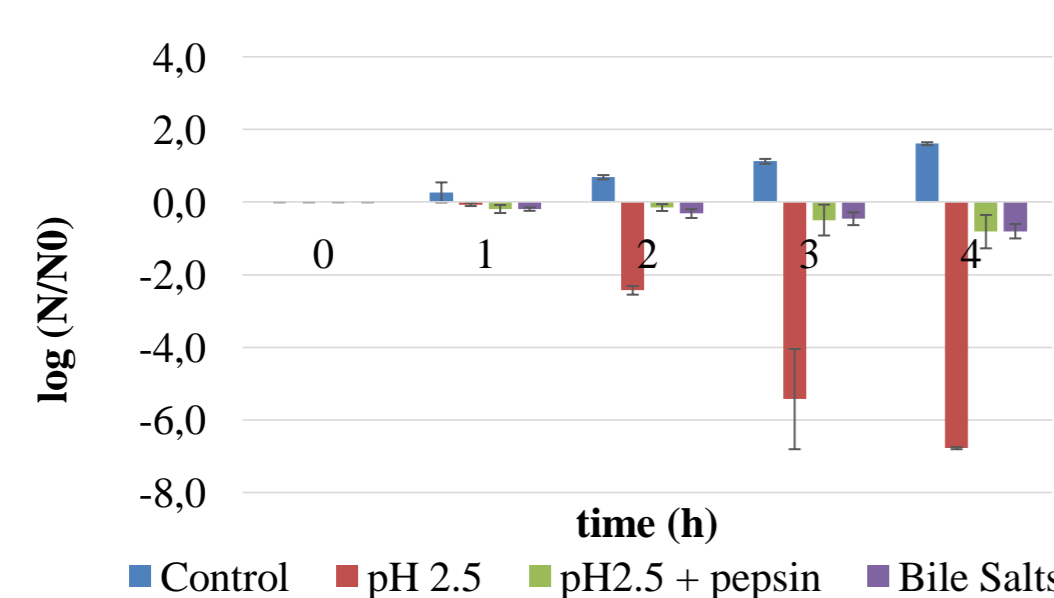


Figure 1. Ability of *Ln. lactis* RK18 to resist in the presence of pH 2.5, pH 2.5 with 1000U/ml pepsin and 0.3% bile salts.

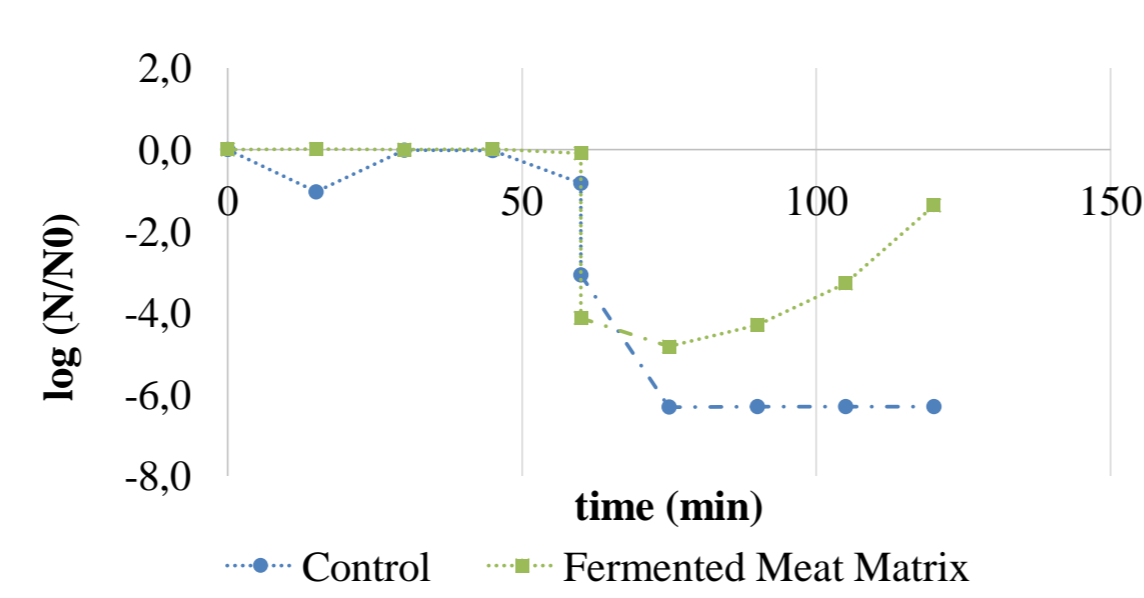
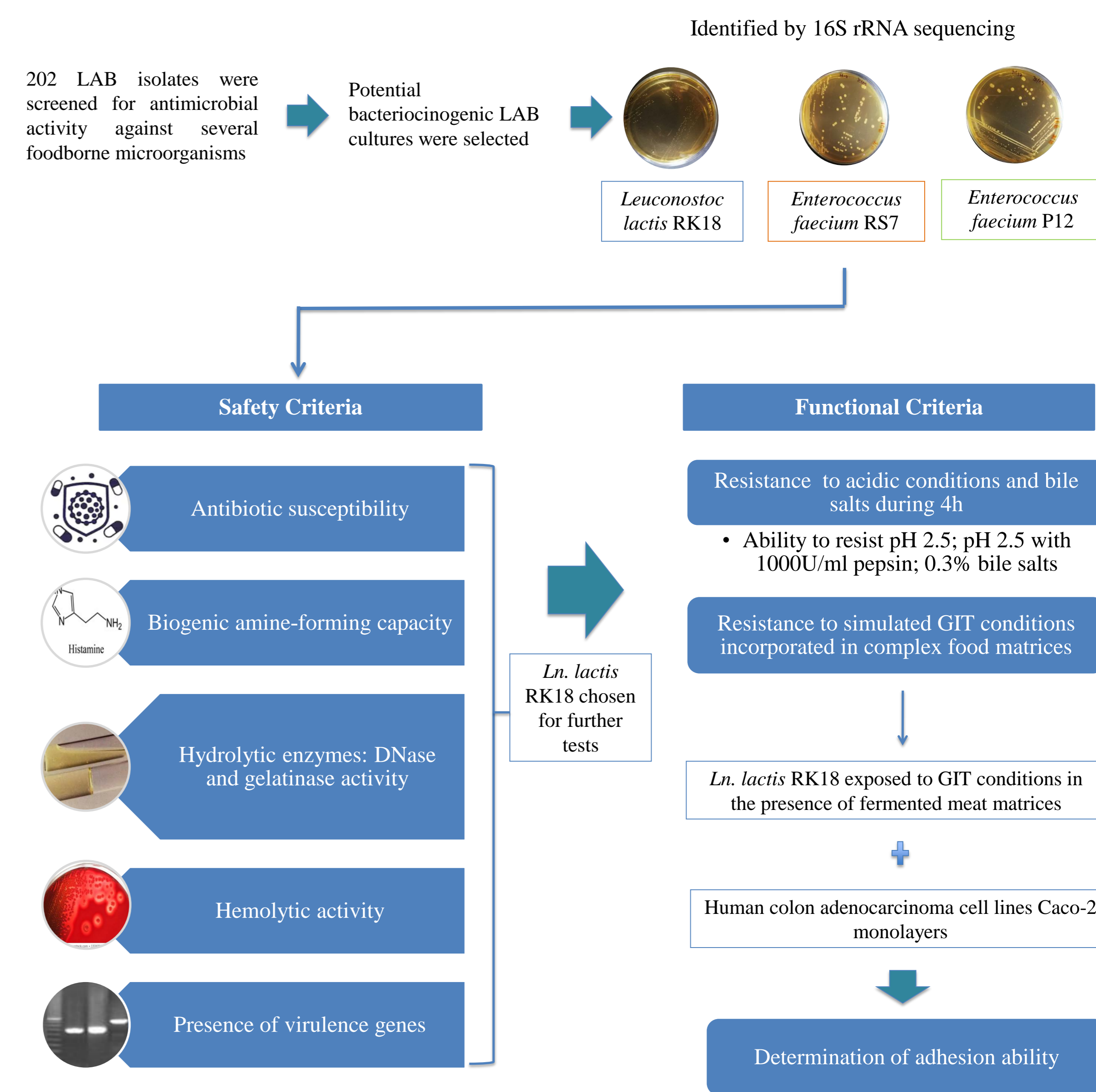


Figure 2. Ability of *Ln. lactis* RK18 to resist through a simulated TGI conditions incorporated in a fermented food matrix.

- *Leuconostoc lactis* RK18 was able to resist during 4h in the presence of bile salts
- Cells of *Ln. lactis* RK18 in acidic condition (pH 2.5) were reduced approximately 2 log cycles either in the presence or absence of pepsin.
- The sensitivity of *Ln. lactis* RK18 to acidic conditions led to the inability to survive through simulated gastrointestinal tract conditions. However, when incorporated into a complex food matrix only a reduction of only ca. 2 log cycles occurred.
- *Leuconostoc lactis* RK18 was also able to adhere *in vitro* to human colon adenocarcinoma cell lines Caco-2 (3.0%) after GIT passage.

## Methods



## Conclusion and Relevance

Even though *in vivo* studies should be performed, *Ln. lactis* RK18 seems to be a potential probiotic to be used in the food industry given its ability to survive through simulated GIT and to adhere to human colon adenocarcinoma cells, as well as having no virulent factors nor virulence genes and being sensitive to all antibiotics recommended by EFSA.

## References

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