



Nutritional enhancement of plant-based products by lactic acid bacteria fermentation

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Background

Dietary shift – need for sustainable plant based food

Pulses are sustainable sources of protein, but contain also e.g. fibers, minerals and vitamins

More options for plant-based food products for consumers are needed



Objectives

To find and apply microbes that are suitable for processing plant based raw materials - pulses and cereals.

To develop and optimize fermentation process for producing high quality food with enhanced digestibility and applicability.

To upscale the process from lab scale to the pilot scale



Photos: Lucia Blasco

Plant based fermentations



Selection of strains for fermentations is of great importance to obtain the desired characteristics of the final product.

We have targeted on:

- Reduction of antinutrient compounds
- Production of bioactive compounds

Results

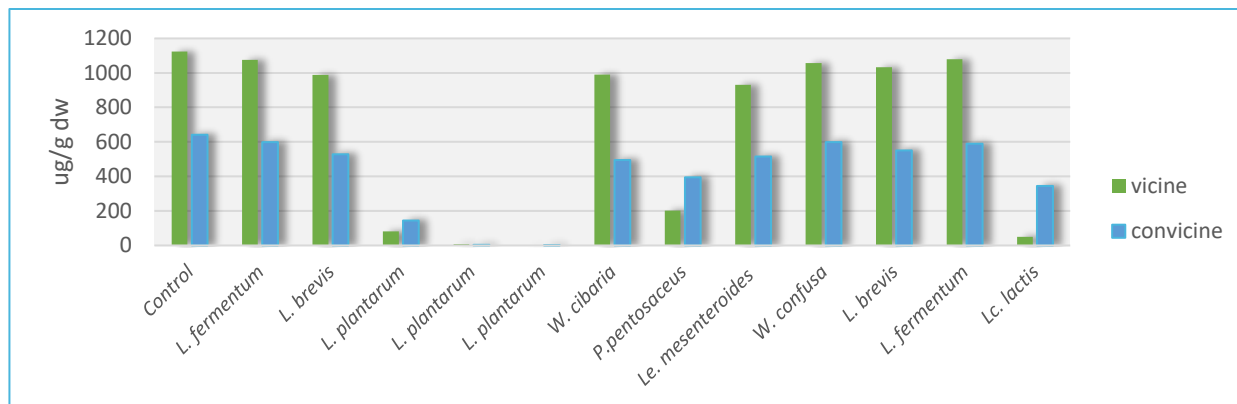
Bacteria belonging to the genera *Lactiplantibacillus*, *Limosilactobacillus*, *Leuconostoc*, *Levilactobacillus*, *Pediococcus*, *Lactococcus*, and *Propionibacterium* were selected for designing microbial consortia for further fermentations

- Good growth of microbes were obtained in suspensions of selected raw materials (pea, faba bean, lentils)
 - in single strain cultivations and
 - when applying microbial mixtures in fermentations
- In addition to chemical analyses, preliminary sensory analyses of products obtained in fermentations were included in the product development.



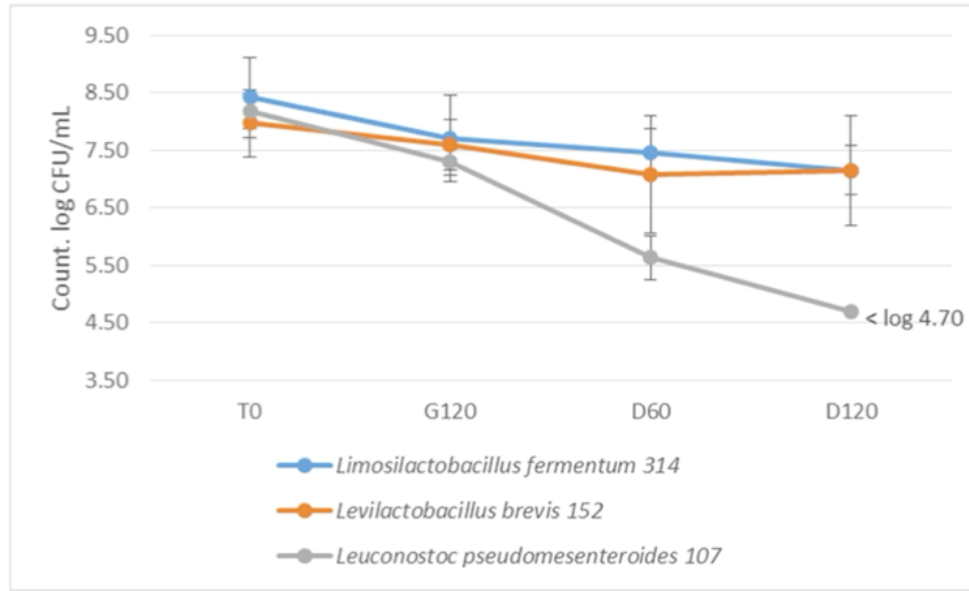
Photos: Lucia Blasco, Luke

- **Analyses of antinutrients were utilized for selecting microbes for microbial starter mixtures**
- **In addition to chemical analyses, preliminary sensory analyses of fermented products were included in the selection of microbial mixtures as well as in development of the product prototype.**



Degradation of vicines in faba bean fermentations by single LAB strains (2 d fermentation at 30 °C)

Survival of LAB strains during in vitro digestion



T0 starting point; G120: gastric phase after 120 minutes; D60: intestinal phase after 60 minutes from the start of the intestinal phase; D120: intestinal phase after 120 minutes from the start of the intestinal phase.

***Levilactobacillus brevis* and *Limosilactobacillus fermentum* showed promising survival rate during in vitro digestion, both through the gastric and the duodenal phase.**

Conclusion

The microbial consortia developed have potential to be utilized in the fermentation process of proteinaceous food leading to prototypes with improved nutritional value, digestibility, micronutrient bioavailability, sensory properties, texture and food safety for human consumption.



Photos: Rina Bragge, Luke



SIMBA

SUSTAINABLE INNOVATION OF MICROBIOME
APPLICATIONS IN THE FOOD SYSTEM

Thank you!

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 818431 (SIMBA). This output reflects only the author's view and the Research Executive Agency (REA) cannot be held responsible for any use that may be made of the information contained therein.

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