PREMIUM
PARTNERS

PREMIUM is a four-year staff exchange **multidisciplinary** program between 5 **academic** partners of three **European** countries (INRA and AgroParisTech, France; University of Madeira and University of Coimbra, Portugal; ICFO, Spain), one **third-country** (CONICET, Argentina) and 3 **European industrial** partners from 3 countries (Biosearch S.A., Spain, Asymptote Ltd., United Kingdom and Cryolog, France).

Institut National de la Recherche Agronomique
www.inra.fr

Institut des sciences et industries du vivant et de l'environnement
www.agroparistech.fr

Universidade da Madeira
www.uma.pt

Universidade de Coimbra
www.uc.pt

Institut de Ciencies Fotoniques
www.icfo.eu

Asymptote Ltd
asymptote.co.uk

Biosearch S.A.
www.biosearchlife.es/en

CLOCK-T° SAS
www.cryolog.com

Consejo Nacional de Investigaciones Cientificas y Tecnicas
www.conicet.gov.ar

Inter/multidisciplinary types of knowledge in PREMIUM

- **Food microbiology and process engineering:** INRA, AgroParisTech, Biosearch, CONICET, Cryolog
- **Biochemistry:** UMa, CONICET, AgroParisTech, INRA, UC
- **Life cycle assessment and multi-criteria analysis**: INRA
- **Cryobiology and biophysics:** Asymptote, INRA
- **Molecular Dynamics:** UC
- **Vibrational spectroscopy and imagery**: ICFO, INRA, CONICET
- **Multivariate analysis**: ICFO, CONICET

PREMIUM
KEY DATA

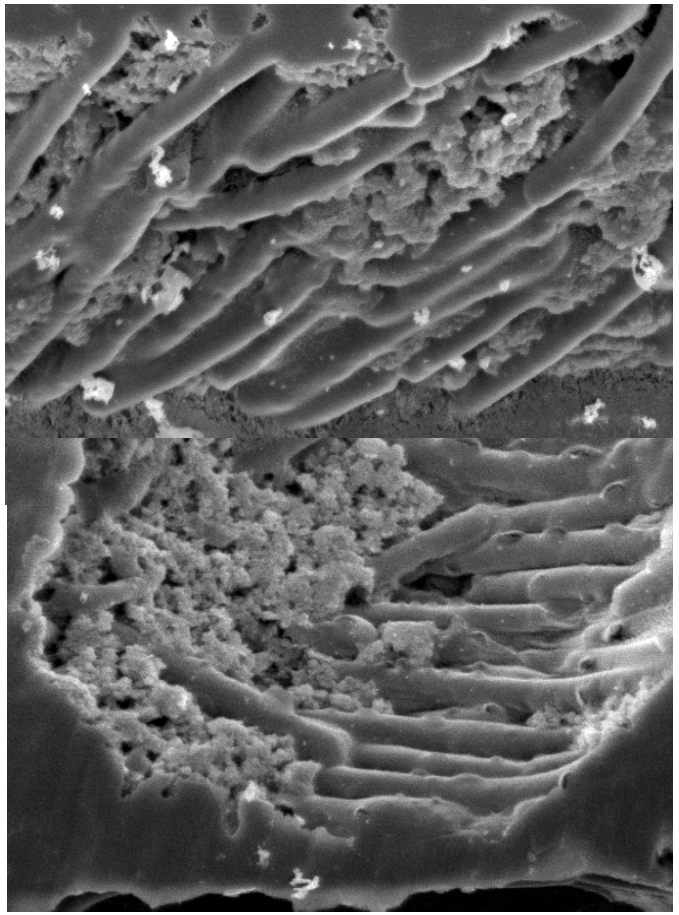
- **Project title: «** Preservation of microorganisms by understanding the protective mechanisms of Oligosaccharides **»**
- **Start day:** January 1st 2018
- **Run time:** December 31th 2021
- **EU funding:** 634500 €

For more information:

➡ **Go to our website**:
http://www.inra.fr/premium

➡ **Contact us by e-mail: PREMIUM@inra.fr**
Coordinator: Fernanda Fonseca
Communication Manager: Caroline Pénicaud

➡ **Follow us on:**



PREMIUM
Preserving bacteria with oligosaccharides and eco-friendly processes

Horizon 2020 - MSCA - RISE - 2017
Research and Innovation Staff Exchange

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 777657

What is PREMIUM about ?

Microorganisms offer a large variety of functionalities that remains under-exploited due to the current inability to perform long term preservation at an industrial scale.

Lactic acid bacteria (LAB), are a family of micro-organisms widely used for producing a wide diversity of fermented foods. The market of concentrated cultures (starters) is continuously growing due to the development of health benefits products, the use of plant origin proteins as fermentation substrate (instead of milk proteins) and also to LAB's ability to convert by-products of green chemistry. The **manufacturing of starters** requires the application of successive operations that generate stresses, potential **cellular damage** and **loss of functionalities**, in particular **following** the stabilisation processes: **freezing, freeze-drying, spray drying**. The process of LAB preservation needs thus to be completely revisited integrating all the steps and the three dimensions involved : product quality, process efficiency and environmental impact, in order to propose original and innovative alternatives to companies and society.

PREMIUM OBJECTIVES

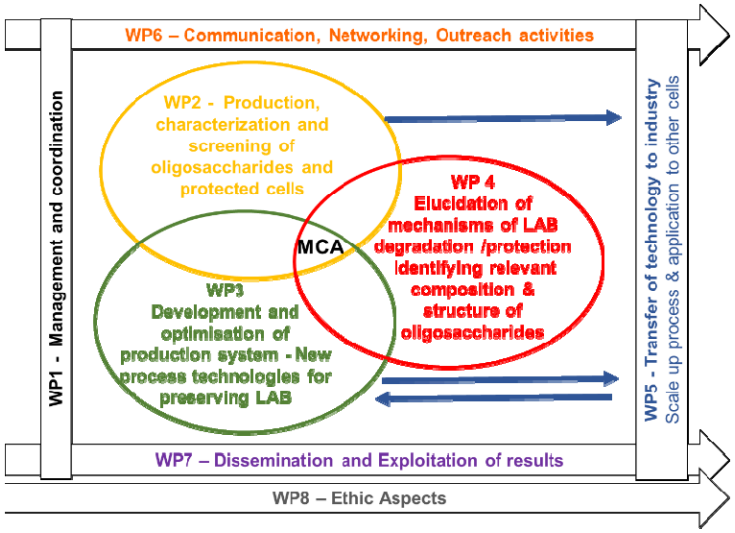
The project aims at **developing new strategies to preserve lactic acid bacteria from laboratory to industrial scale.**

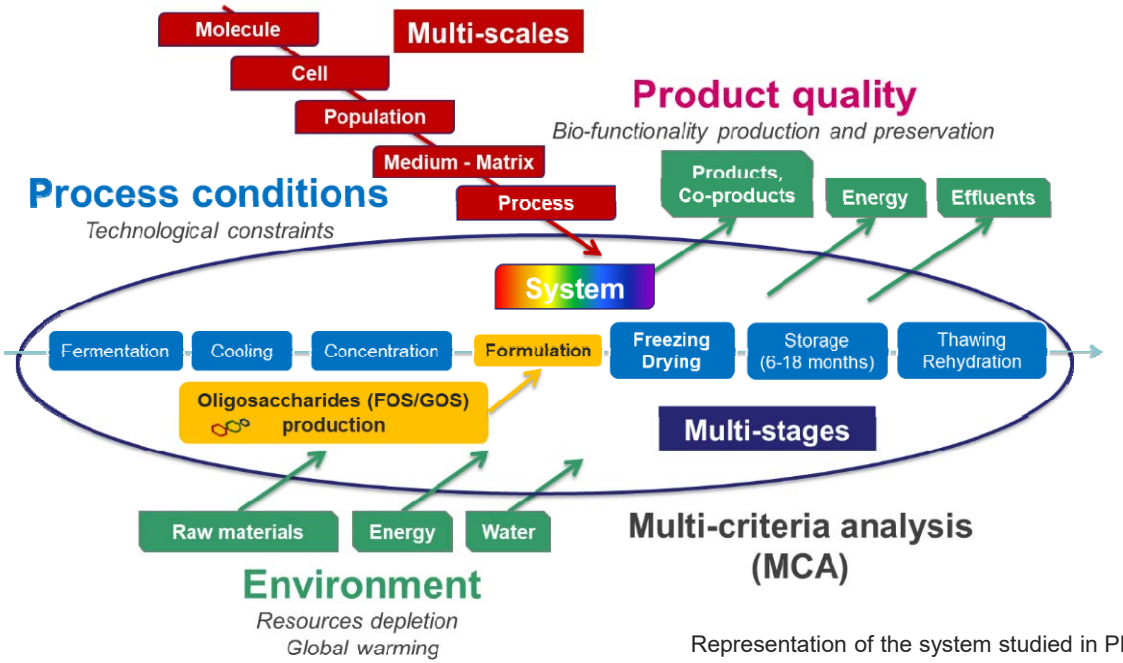
The innovative approaches of the project lay on:

- ✓ Producing **oligosaccharides of original composition** for protecting cells;
- ✓ Developing **novel preservation process** and evaluating the environmental impact of the whole system of production of micro-organisms from the laboratory to the industrial scale;
- ✓ Elucidating the **mechanisms of bacteria preservation** for defining relevant composition and structure of oligosaccharides;
- ✓ Developing **high-throughput tools** for the characterization and screening;
- ✓ Identifying the most promising strategies for industrial **eco-friendly preservation of microorganisms by developing a multicriteria analysis (MCA) approach.**

The structure of PREMIUM

8 Workpackages





Representation of the system studied in PREMIUM:
Production and stabilisation of LAB by using Oligosaccharides

At the end of PREMIUM…

… stable and more eco-friendly starters

PREMIUM SINGULARITIES & IMPACT

- ✓ To study different model **strains** covering a **wide range of applications**, physiological conditions and industrial interests.
- ✓ To improve LAB stabilisation processes according to three main dimensions: quality, costs and environmental impact.
- ✓ To propose rational formulation and stabilisation protocols with great potential for preserving micro-organisms' biodiversity and other cells.
- ✓ To **strengthen partners' skills** through training and knowledge exchange within a complementary and **multidisciplinary** consortium.
- ✓ To reinforce exchanges between recognised **scientific and industrial** partners.
- ✓ To raise **awareness** among starters producers, stakeholders and society at large to include **sustainability approaches** in the design and/or improvement of process lines.