

The background of the slide is a top-down photograph of a healthy meal. In the center is a glass bowl filled with a pink smoothie, topped with granola, fresh raspberries, blueberries, and chia seeds. The bowl sits on a wooden cutting board. Surrounding the bowl are various items: a small white bowl of granola, a small white bowl of chia seeds with a spoon, a small glass jar of flaxseed, and several small pink and yellow flowers. The entire scene is set on a wooden surface with a green cloth napkin.

# **BIOPROX offer for plant based recipes: Current range and Future Development**



**Plant based lacto  
fermented and  
probiotic trends**



**BIOPROX culture offer  
and expertise**



**Development and  
Partnerships  
opportunities**



A glass of light-colored smoothie topped with saffron, nuts, and seeds, next to a bowl of mango and a pear. A large blue circle is overlaid on the right side of the image.

# What's up in the plant based market

# Plant based trends: Why ?

To answer the societal questions around search for better health and the preservation of the environment

Article LSA Conso 06/2019 – Nielsen - IRI



## Ethical dilemmas

Consumers are becoming more environmentally friendly and conscious of the environmental impacts of their purchasing choices, and are avoiding dairy as a result.



## Health-conscious consumers

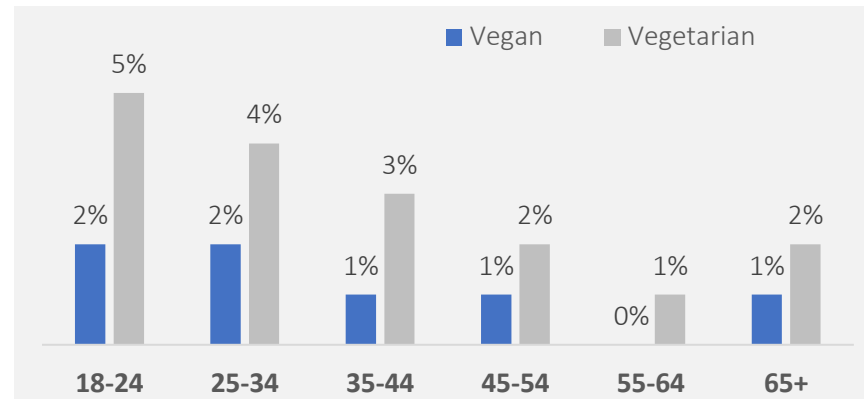
Consumers looking for plant based alternatives with high nutritional values and health benefits.

# Plant based trends: For who ?

## → For vegan and vegetarian ?

% vegan & vegetarian consumers  
per age category

→ Increasing but still limited



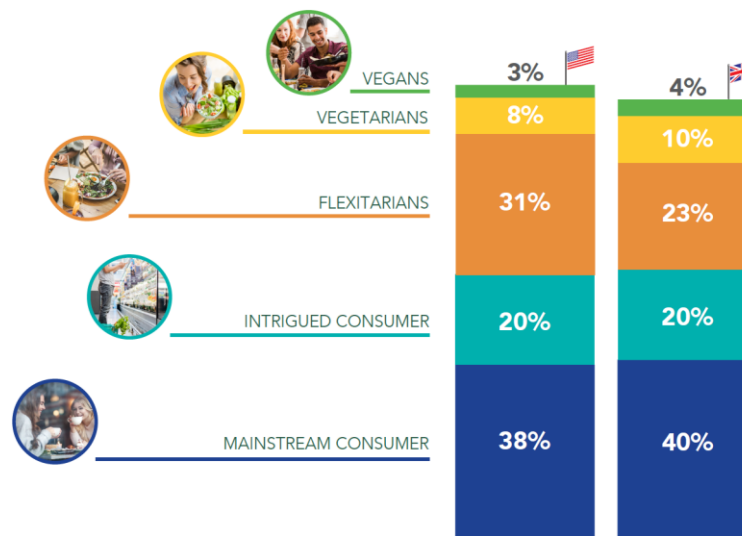
## → Objective = FLEXITARIAN & «REDUCERS»

→ Consumers and particularly millenials are **open / curious for novelty** and looking for **alternatives** to fermented products from animal origin to **reduce their impact**

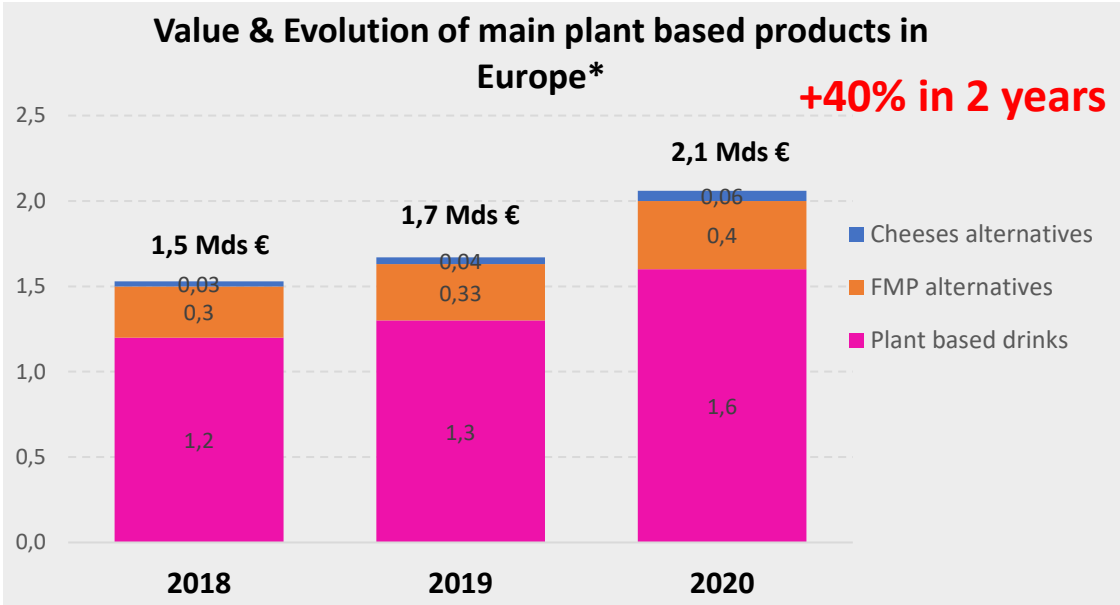
Profile of plant based alternatives  
consumers in US & UK (Proveg  
International study, 2020)



Proveg Consumer  
study 2020



# Plant based Market: Dairy Alternatives



\* Source: Smart Protein d'après Nielsen Market Track CAM 2020





## Kaiku - Spain

### → MULTIPLICATION OF BENEFITS



<https://kaikubegetal.es/>

- LACTOSE-FREE
- GLUTEN-FREE
- SOY-FREE
- TRANSGENIC-FREE
- NO ARTIFICIAL COLOURING & SWEETNERS
- PRESERVATIVE-FREE
- GELATIN-FREE
- ASPARTAME-FREE

## Biomel - UK

### → PROBIOTICS / GUT HEALTH



- LOVE YOUR GUT
- PROBIOTIC SHOT WITH BILLIONS OF LIVE ACTIVE CULTURES
- DAIRY FREE

<https://www.biomel.life/>

# Plant based Market: «Lacto» fermented juices

Kombucha, Fruit Kefir, Fermented Vegetable or Fruit juices ...



Portugal – Kombucha – Online sales

<https://gutsycaptain.shop/>



US – Lacto-fermented juices

<http://www.growraworganic.com/>



France – Lacto fermented vegetables

<https://www.nutriform.bio/carotte-lacto-fermentee-frais-nutriform/>



## Improvement of nutritional properties:

- Less sugar
- More B vitamin
- Better digestibility
- Improvement of anti oxidant properties
- Alive yeast and bacterias ...



# Plant based Market: Probiotic drinks

Non fermented



**US with probiotics supporting immune system**  
**3.10E+6 cfu/mL**  
<https://www.chobani.com/products/probiotic/>



**GB with billiards of live and active bacteria**  
<https://www.biomeL.life/>



**France - Innocent (Coca-Cola)**  
**Claim = 500 billions of micro organisms**

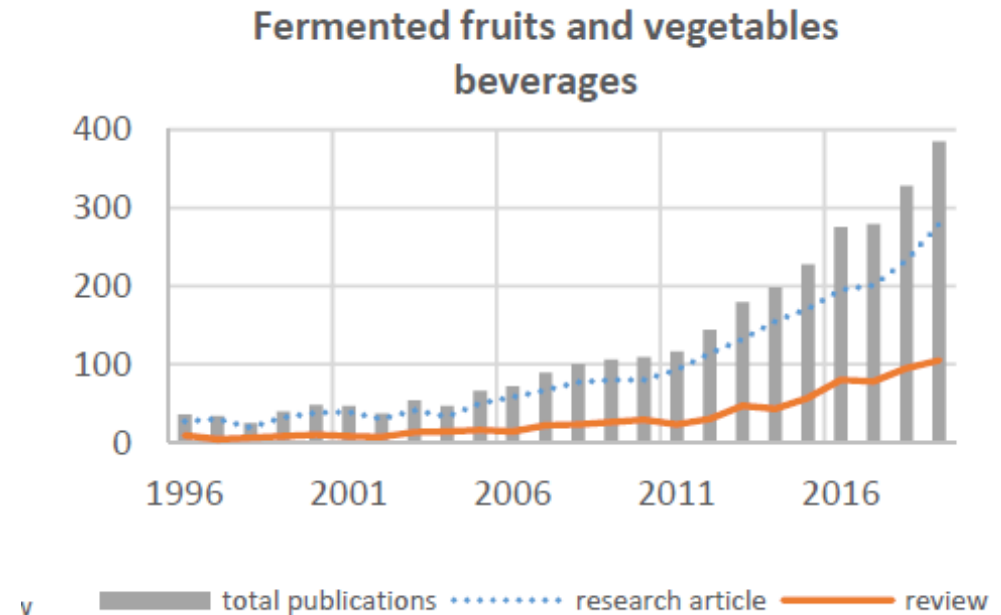


**US with *Bif lactis* HN019 – 5.10E+6 cfu/mL**  
<https://www.tropicana.com/products/tropicana-essentials/pineapple-mango-tep>

# Plant based Market: Which futur?

Scientific litterature on this topic is increasing

➔ Growing interest = multiplication of studies and articles related to fermented fruits and vegetables (beverages)



*Review*

## Lactic Fermented Fruit or Vegetable Juices: Past, Present and Future

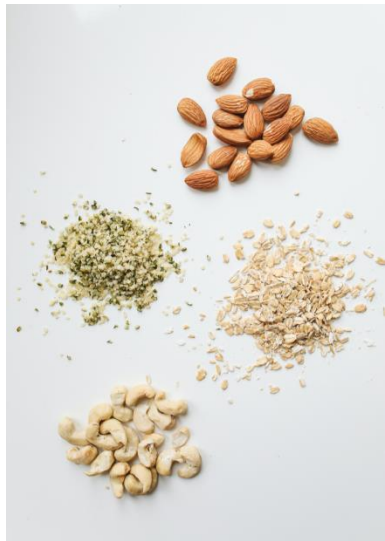
Cyrielle Garcia \*, Marie Guerin, Kaies Souidi and Fabienne Remize

Qualisud, Univ La Réunion, CIRAD, Univ Montpellier, Montpellier SupAgro, Univ Avignon, 2 rue Wetzell, F-97490 Sainte Clotilde, France; marie.guerin15@gmail.com (M.G.); kaies.souidi@univ-reunion.fr (K.S.); fabienne.remize@univ-reunion.fr (F.R.)

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Received: 14 December 2019; Accepted: 28 January 2020; Published: 11 February 2020

# Conclusion



**Dairy alternative market** has developed a lot over the last years but still opportunities

**Improvement of existing recipes** (nutritional profile, sustainability, raw material origin, organoleptic profiles ...)

**Development of other applications** (fresh cheeses, spreadable, snacking drinks ...)

**Potential of Hybrid concepts**

**Lacto fermented vegetables / fruits juice** are developing thanks to better consumer knowledge of fermented products benefits

High opportunities also in the **non fermented probiotic versions in the refrigerated corner**



A glass of light-colored smoothie, possibly mango or pineapple, topped with a mix of dried fruits, nuts, and saffron threads. In the background, there is a bowl of fresh mango cubes and a whole mango. A large blue circular graphic is overlaid on the right side of the image, containing the main text.

**Take your benefits  
from market growth  
thanks to our Cultures  
and Concepts**

# BIOPROX OFFER FOR DAIRY ALTERNATIVES (FRESH)



VEGETAL



NEW RANGE VEGI-PROX  
100% Dairy Free

## YOGHURT ALTERNATIVES

### VEGI-PROX 01 / VEGI-PROX 02

*Sc thermophilus* combination  
Mild and Texture production

### VEGI-PROX Y1

*Sc thermophilus*, *Lb bulgaricus*



## VEGETAL KEFIR

### VEGI-PROX Kefir 1 & Kefir 2

Combination of multiple strains to develop aromatic, smooth and slightly fizzy end products

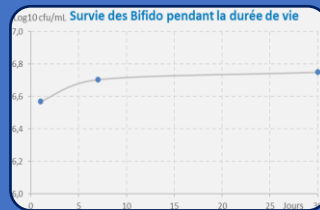
Available with and without yeasts



## PROBIOTIC RANGE

- *Lb rhamnosus* 6870
- *Lb paracasei*
- *Bf lactis* 5764
- *Lb casei*

More than 20 strains

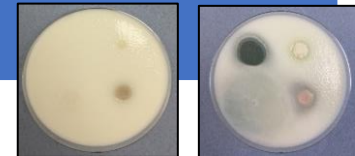


## BIOPROTECTION & AROMATIZATION

### VEGI-PROX RP80

Combination of *Lb rhamnosus*, *Lb plantarum*

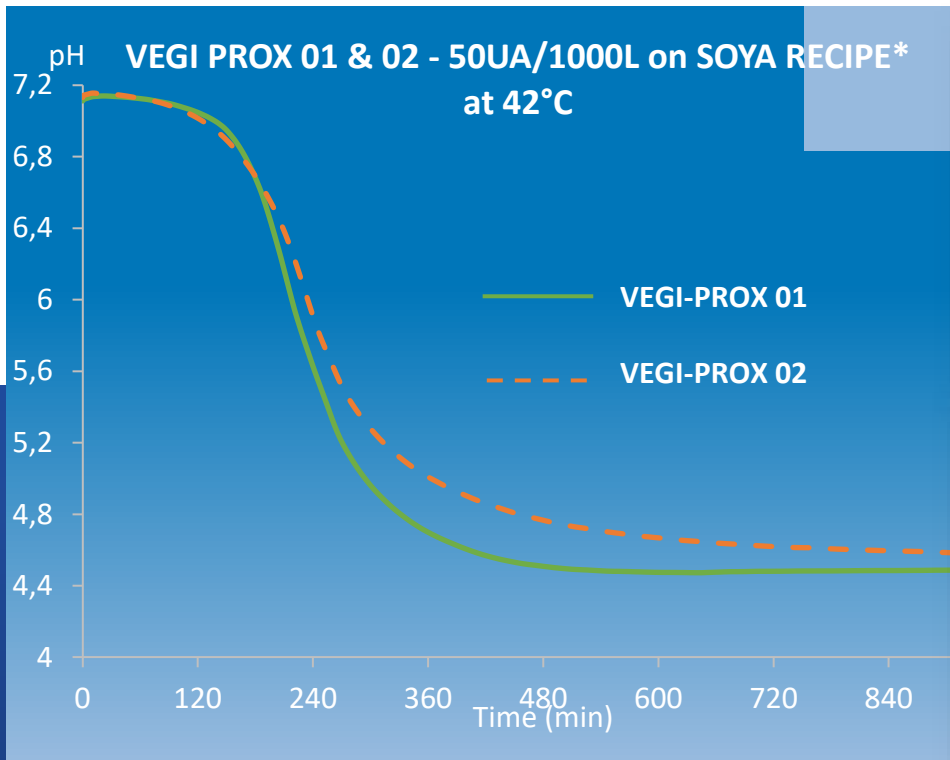
Large spectrum of efficiency against yeast and moulds and creamy flavor development



# VEGI-PROX OFFER FOR DAIRY ALTERNATIVES



**VEGI-PROX® 01 & VEGI-PROX® 02** → New cultures for optimal fermentation of multiple plant based recipes (soya, oat, sunflower, almonds, nuts...)



**Sensory profile:** High, smooth and short texture, creamy mouthfeel

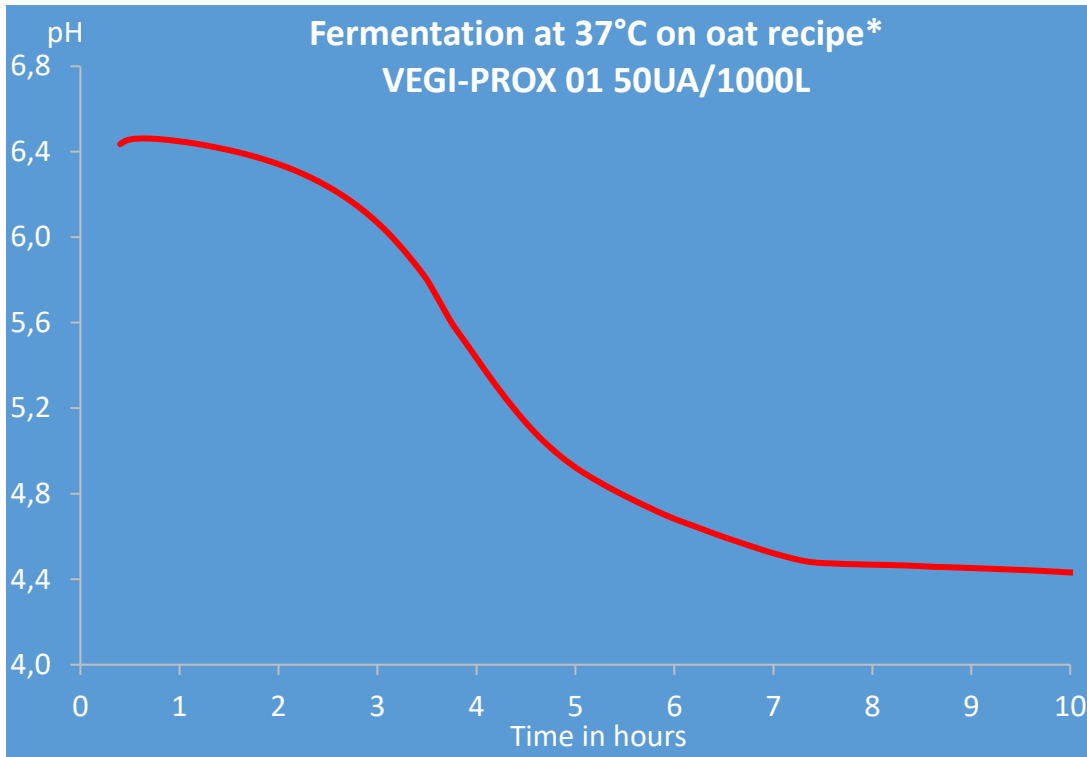
\* Fat=2,6% & Proteins=3,9%



# VEGI-PROX OFFER FOR DAIRY ALTERNATIVES



**VEGI-PROX® 01 & VEGI-PROX® 02** → New cultures for optimal fermentation of multiple plant based recipes (soya, oat, sunflower, almonds, nuts...)

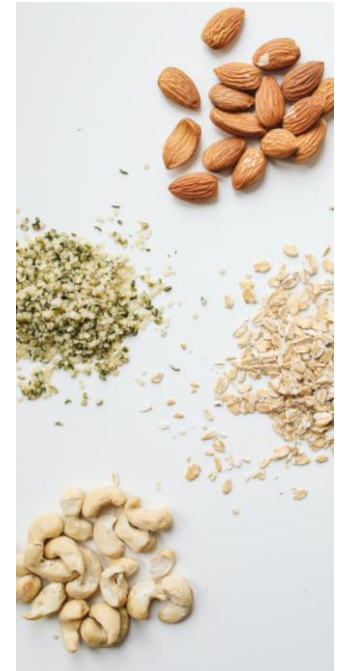
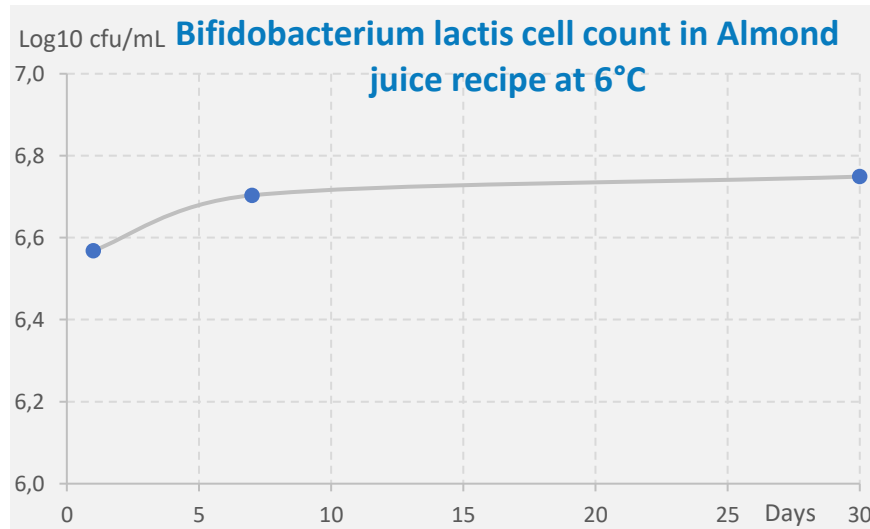


**Sensory profile:** High, smooth and short texture, creamy mouthfeel and mild flavor

\* Fat=1,2% & Proteins=2,4%

## Characteristics & Benefits

- 100% vegan strain
- Very stable strain in different plant based recipes during shelf life (6°C)
- Breast milk origin
- Going through gastro intestinal tract & anti inflammatory potential\*



\* Strain studied regarding impact on Crohn disease by Institut Pasteur (Lille – France).  
Article published in Nature Research in 2020

# BIOPROX OFFER FOR DAIRY ALTERNATIVES (CHEESES)



VEGETAL



NEW RANGE VEGI-PROX  
100% Dairy Free

## ACIDIFICATION AND TEXTURATION

VEGI-PROX 01 / VEGI-PROX 02

*Sc thermophilus* combination

### ACIDIFICATION (OVERNIGHT)

*Lb plantarum*, *Pedicoccus acidilactici*...

*Lc lactis ssp lactis*

## SURFACE & RIPENING

AROMA-PROX DH & CU

Yeasts

AROMA-PROX GC range

*Geotrichum candidum*



## AROMATIZATION

VEGI-PROX RP80

Combination of *Lb rhamnosus*, *Lb plantarum*

Creamy flavor development

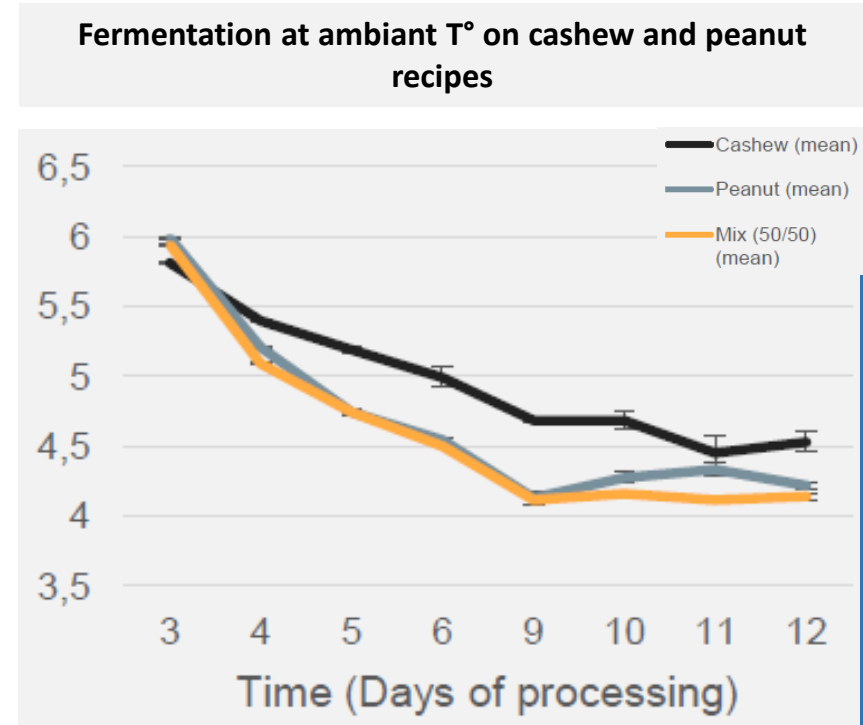
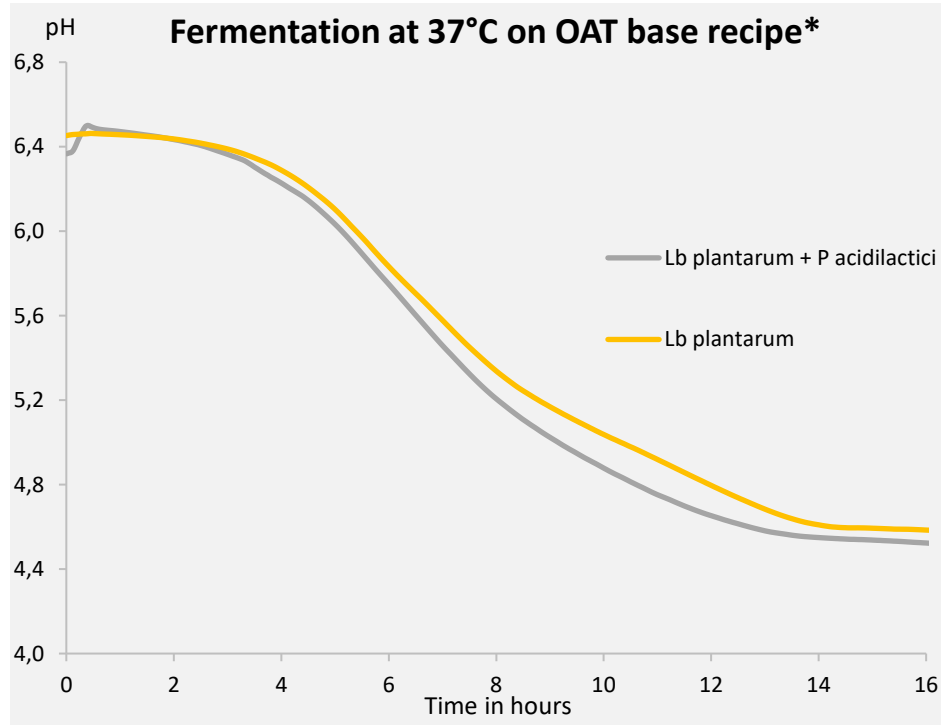




# VEGI-PROX OFFER FOR DAIRY ALTERNATIVES



VEGI-PROX® cultures performances on different plant based recipes (oat, cashew, peanut)



\* Fat=1,2% & Proteins=2,4%



# BIOPROX OFFER FOR LACTO FERMENTATION OF FRUITS & VEGETABLES (JUICES, PURÉES)



## ACIDIFICATION AND AROMATIZATION

Selected cultures able to develop even in recipes with low pH start and produce specific flavor profiles

VEGI-PROX *Lb plantarum*, *Lb rhamnosus*, *Lb casei*, *Lb paracasei*...

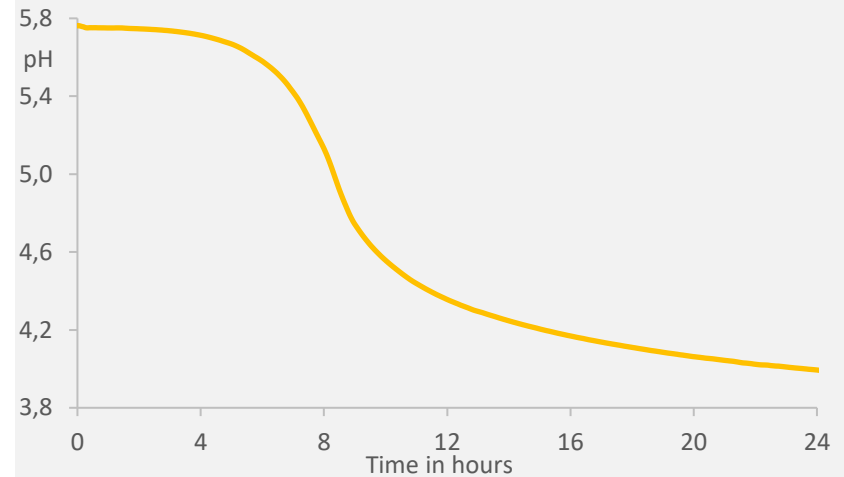


## AROMATIZATION & FIZINESS

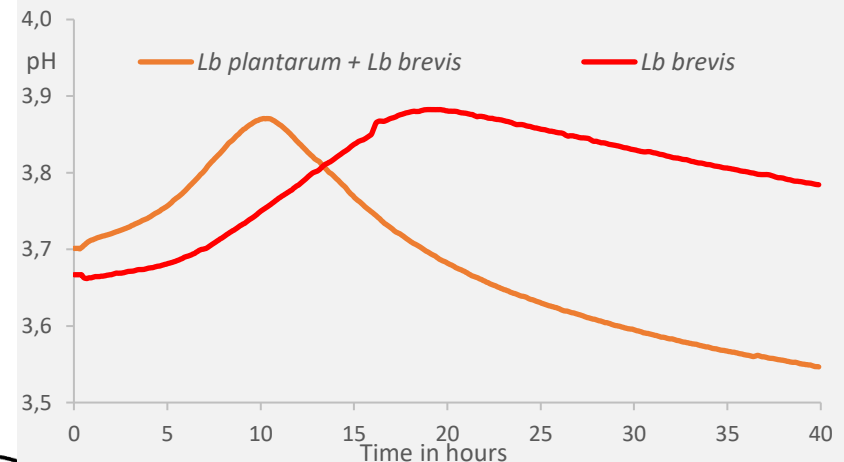
Selected cultures with light acidification and slight sparkling profile

VEGI-PROX *Lb brevis*, *Lb fermentum*, *Ln mesenteroides*...

Carrot Juice fermentation at 34°C with VEGI-PROX *Lb plantarum*



Multifruit Juice fermentation at 30°C with VEGI-PROX *Lb brevis* & *Lb plantarum* + *Lb brevis*

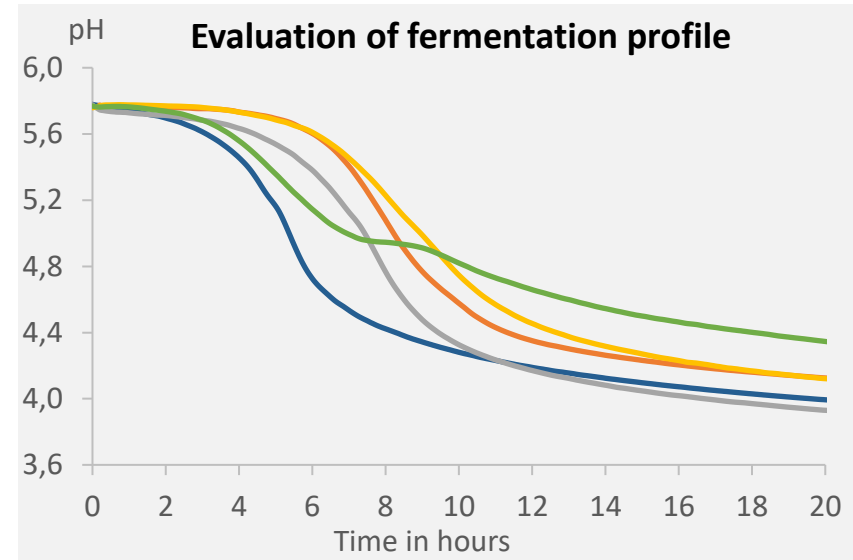


# BIOPROX OFFER FOR LACTO FERMENTATION OF PLANT BASED RECIPES

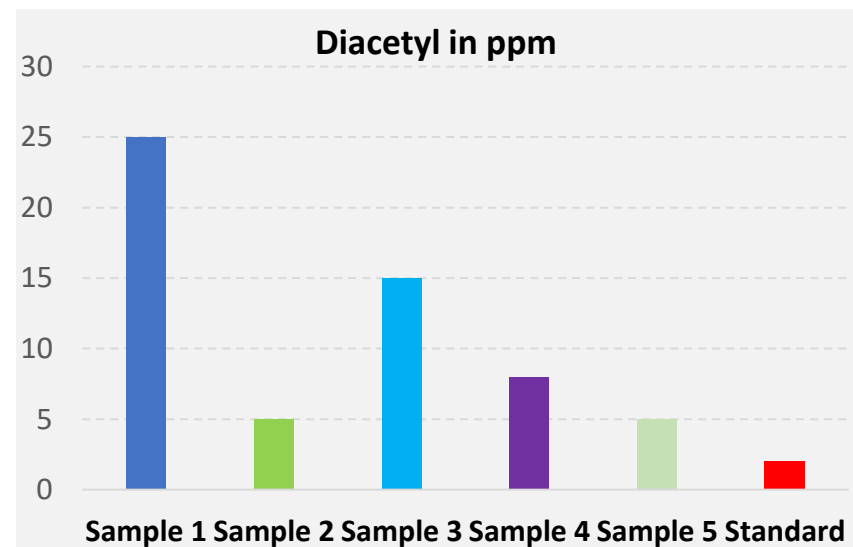
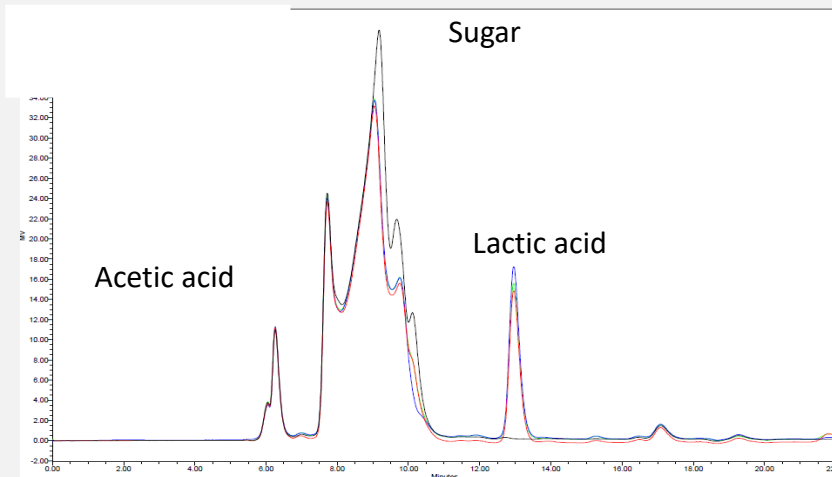


## Support in the development & positioning of finished products

- Strains screening on your recipes
- Optimization of fermentation parameters
- Characterization of end product characteristics (sugar consumption, flavor production, sensory)



## Sugar consumption and organic acid production (HPLC)



# Ongoing developments & Partnership opportunities



# ONGOING DEVELOPMENTS: FRIEND PROJECT



## WINNER OF THE BPI FRANCE INNOVATION COMPETITION



FRIEND is a 2 year innovation project. It is carried by the BIODIS SME, winner of the Innovation competition as part of the Future Investments Program coordinated by BPI France.

Total cost = 979,7 K€



Isolation and selection of **lactic acid bacteria from plant** (fruits and vegetables) marketable as:

- Lactic cultures with technological properties toward lacto fermentation of fruits / vegetables juices and improvement of the nutritional quality of end products
- Ingredient to be used in food supplement with probiotic benefit

**FRIEND** is bringing value to plant based products thanks to fermentation with selected lactic acid bacterias from plant based origin improving the original nutritionnal and organoleptic profiles of the end product.



# FRIEND OBJECTIVES

## Dairy Alternatives

- Lactofermentation
- Improvement of organoleptic profile (flavor, texture)
- **Nutritional benefits:**
  - ✓ Improvement of certain mineral bioavailability
  - ✓ Live and active flora

## Fruit / Vegetables

- Lactofermentation
- Bioprotection
- Innovative organoleptic profile (flavor, gaz...)
- **Nutritional benefits :**
  - ✓ Sugar reduction
  - ✓ Live and active flora
  - ✓ Polyphenols with better absorption

## Food supplement

- Probiotic
- **Nutritional benefits:**
  - ✓ Lipids metabolism
  - ✓ Anti inflammatory action

- Experience in the screening of specific strains with plant based origin
- Skills regarding control and optimization of culture conditions of fermentation
- Expertise in the determination of strains probiotics properties
- High stability of the end products during shelf life
- Partnership with different dairy schools to multiply the application possibilities





## CONCLUSION



BIOPROX helps you develop and produce the right **DAIRY ALTERNATIVES** (fermented, non fermented) thanks to:

- ✓ **Complete range of cultures for fermentation of multiple plant based recipes**
- ✓ **Range of cultures selected for their texturation, flavor development & nutritional benefits properties**
- ✓ **Large range of dairy free probiotics with high stability into the end product during shelf life**
- ✓ **Experience in different applications and recipes**

BIOPROX helps you develop and produce the right **LACTO-FERMENTED VEGETABLE** (and fruits) juices recipes thanks to:

- ✓ **Well characterized performances in application & efficient strains of *Lactobacillus sp* (*Lb plantarum*, *Lb casei*, *Lb rhamnosus*...)**
- ✓ **Experience in different applications and recipes**
- ✓ **Support in specific screenings**

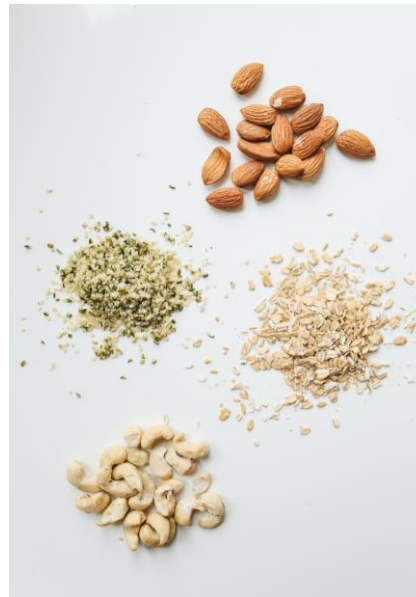
More to come regarding anti oxidant and possible other probiotic properties thanks to FRIEND project

# THANKS

FOR YOUR ATTENTION

# Additional slides

- BIOPROX range details
- BIOPROX concepts in dairy alternatives
- BIOPROX competences in R&D and production





# BIOPROX OFFER



Product code	Denomination	Packaging
644094	<b>VEGI-PROX 01</b>	10UA, 20UA
644143	<b>VEGI-PROX RP80</b>	30D

Product code	Denomination	Rk
643748	<b><i>Lb brevis 5542</i></b>	Heterofermentative (lactic acid, acetic acid or ethanol and CO2 production)
620174	<b><i>Ln mesenteroides 1501</i></b>	
643749	<b><i>Lb fermentum 6529</i></b>	
643696	<b><i>Lb fermentum 6187</i></b>	
643509	<b><i>Lb plantarum 1096</i></b>	Facultatively heterofermentative (mainly lactic acid p°)
643588	<b><i>Lb casei 5773</i></b>	
643649	<b><i>Pediococcus acidilactici 6314</i></b>	

Code	Culture	Composition	New name
643582	<b><i>Bf. lactis</i></b>	<i>Bifidobacterium animalis subsp lactis 5764</i>	
643556	<b><i>L. paracasei</i></b>	<i>Lactobacillus paracasei 5452</i>	<i>Lacticaseibacillus paracasei 5452</i>
643673	<b><i>L. acidophilus</i></b>	<i>Lactobacillus acidophilus 6307</i>	
643583	<b><i>L. johnsonii</i></b>	<i>Lactobacillus johnsonii 5467</i>	
643774	<b><i>L. rhamnosus</i></b>	<i>Lactobacillus rhamnosus 6870</i>	<i>Lacticaseibacillus rhamnosus 6870</i>



# Probiotic range 100% VEGETARIAN COMPATIBLE



- Range of more than 20 strains grown on media without allergens
- Strains genetically characterized and antibiotic resistance patterns known
- Resistance to gastro intestinal conditions

## *Lactobacillus*

<i>Lb. acidophilus</i>	<i>Lb. johnsonii</i>
<i>Lb. brevis</i>	<i>Lb. lactis</i>
<i>Lb. casei</i>	<i>Lb. paracasei</i>
<i>Lb. crispatus</i>	<i>Lb. plantarum</i>
<i>Lb. fermentum</i>	<i>Lb. reuteri</i>
<i>Lb. gasseri</i>	<i>Lb. rhamnosus</i>
<i>Lb. helveticus</i>	<i>Lb. salivarius</i>
<i>Lb. jensenii</i>	

## *Bifidobacterium*

<i>Bf. adolescentis</i>
<i>Bf. bifidum</i>
<i>Bf. breve</i>
<i>Bf. infantis</i>
<i>Bf. lactis</i>
<i>Bf. longum</i>



- Production of tailor made strains (know how)
- Application of advanced technics to check strain purity
- Development of new tests and new strains more documented and with great stability.

Thanks to our latest cultures development

3 concepts 100% vegetal or mixes offering improvement regarding :

- Nutritional profile
- Sensory profile
- List of ingredients to have 100% natural formulations
- Sustainability profile

1

Drink **100% plant based** not fermented containing **probiotic strain** known for **its gut health** benefits

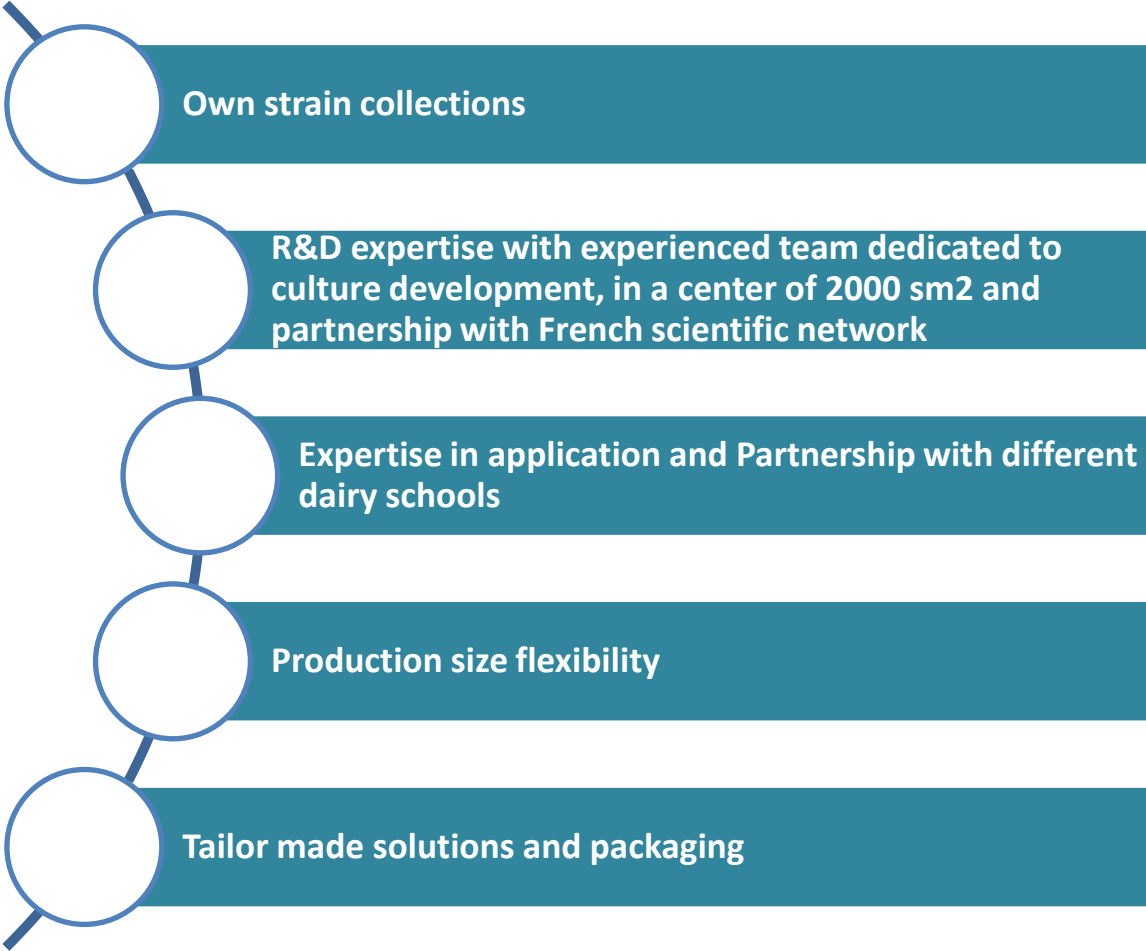
2

'Speciality' **100% plant based** fermented **100% natural** thanks to a combination of **lactic acid bacteria with texturizing properties 100% DF**

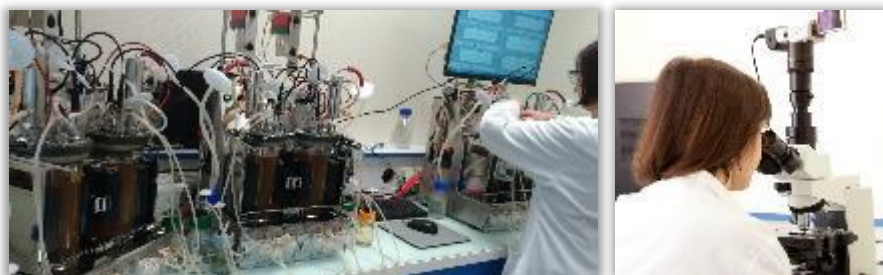
3

**Hybrid specialty** fermented **100% natural** thanks to a combination of **cultures with texturizing properties**

# BIOPROX assets for developping original solutions for plant based fermentation



# Our study and Discover Center



## In numbers

- **+ 10% of turnover** invested in R&D
- **17 doctors, engineers & technicians** dedicated to the development of cultures and technical support
- May 2020 : **1000 m2 extension** of the R&D Centre
- **Partnership with the French scientific network**

## Technical support & dedicated services

- **High level of responsiveness** appreciated by our customers.
- **Personalized analysis** and development of **tailor-made solutions**.
- **Considerable technical expertise** (from fermented milk to matured cheese).
- **Toll manufacturing contract**.

Production capacity

**+€ 13 M**

invested over the  
past

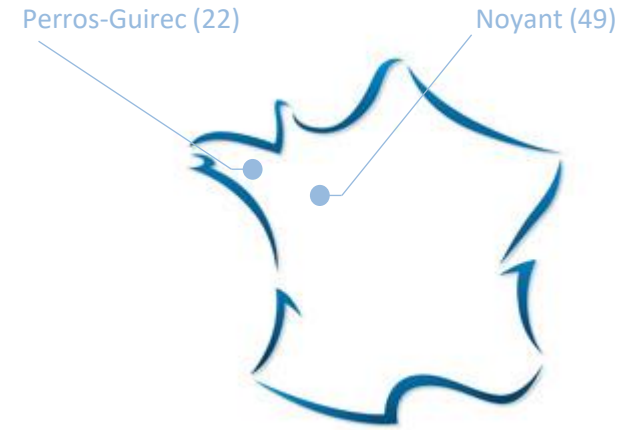
**10 years**



# Our production sites



- ✓ Scientific **reliability**
- ✓ **Quality**
- ✓ **Diversification**
- ✓ **Flexibility** and **adaptability**
- ✓ Sustainable and natural biotechnological solutions
- ✓ Collection of **strains**
- ✓ Selection and identification
- ✓ **Improvement** of the technological process
- ✓ Development of **new products**



8

Lyophilizers



## Fermentation and Lyophilisation



3

Fermenters

