



HAL
open science

Development of innovative fermented products by exploiting the diversity of immunomodulatory properties and fermentative activity of lactic and propionic acid bacteria

Gwénaél Jan

► **To cite this version:**

Gwénaél Jan. Development of innovative fermented products by exploiting the diversity of immunomodulatory properties and fermentative activity of lactic and propionic acid bacteria. 18e congrès national de la SFM “ Un monde à explorer ”, Société Française de Microbiologie (SFM), Oct 2023, Rennes, France. hal-04234356

HAL Id: hal-04234356

<https://hal.inrae.fr/hal-04234356>

Submitted on 10 Oct 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial - NoDerivatives 4.0 International License

INRAE

➤ Development of innovative fermented products by exploiting the diversity of immunomodulatory properties and fermentative activity of lactic and propionic acid bacteria

Gwénaél JAN

STLO, INRAE, Institut Agro, Science et Technologie du Lait et de l'Œuf, Rennes

gwenael.jan@inrae.fr

<https://www6.rennes.inrae.fr/stlo>



- Ce projet a été sélectionné suite à l'appel à projet du Fond Unique Interministériel, FUI 25



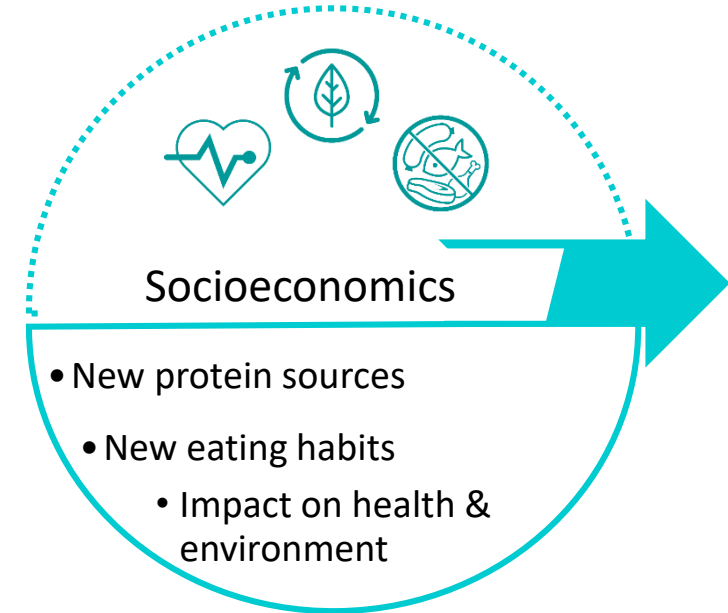
INRAE

Probiotic fermented products
SFM 2023, Rennes, BZH, G. Jan

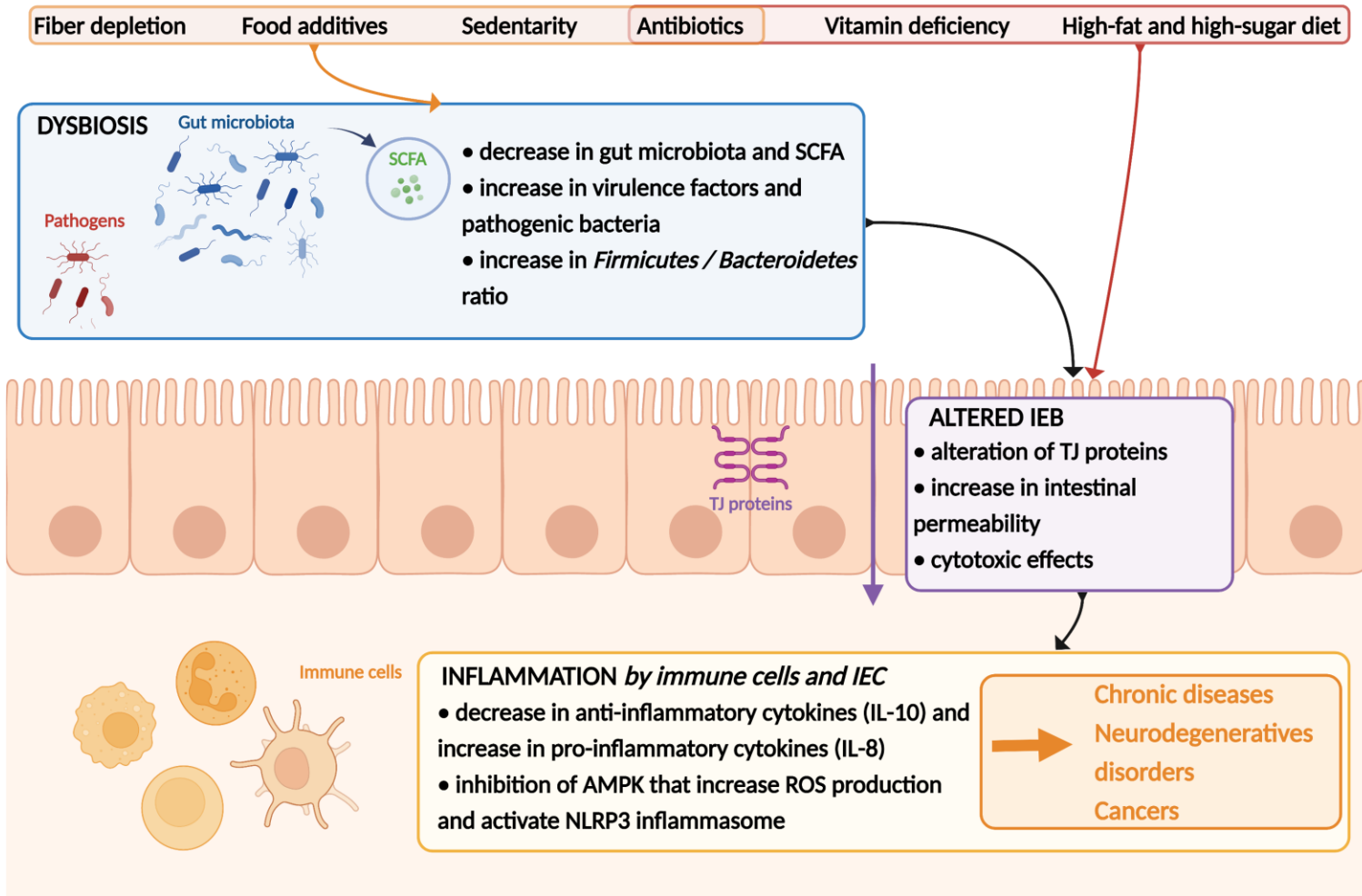


> A quest for a greener diet

Consumer habits evolution
Vegan & flexitarian

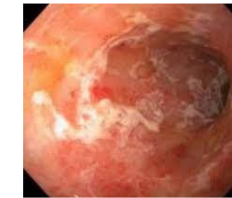


➤ A quest for immunomodulatory food



Colitis

- GIT Chronic inflammation



Ulcerative Colitis



Beneficial effects of selected probiotics

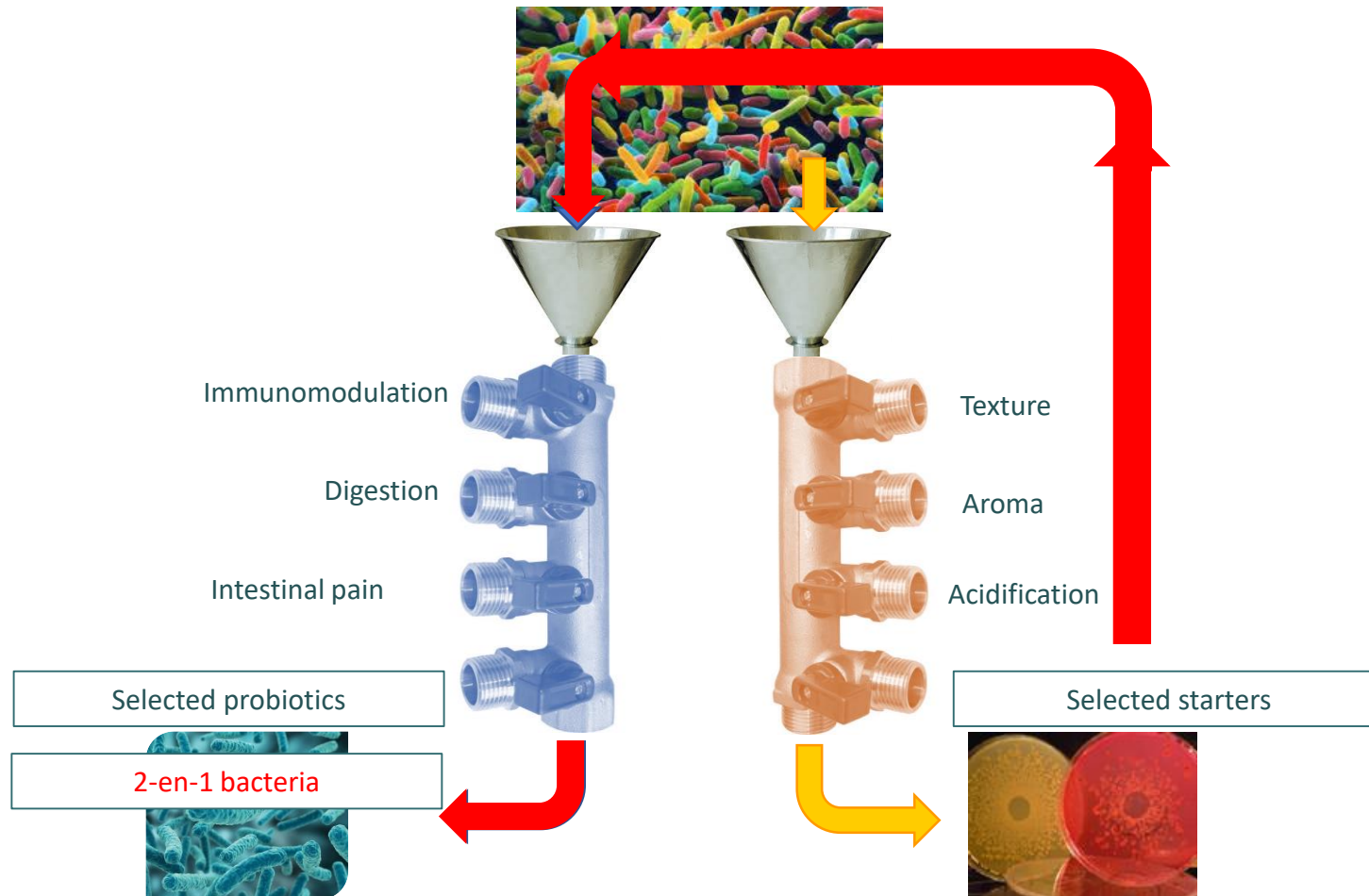


INRAE

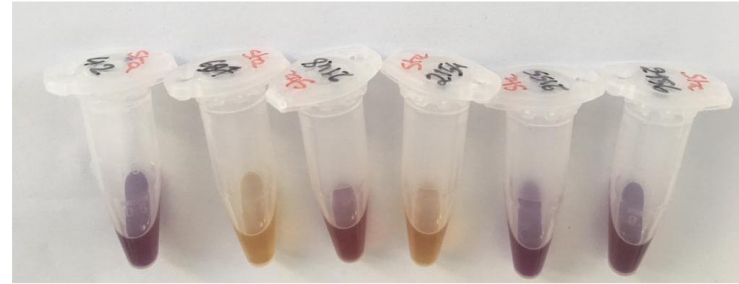
Probiotic fermented products
SFM 2023, Rennes, BZH, G. Jan



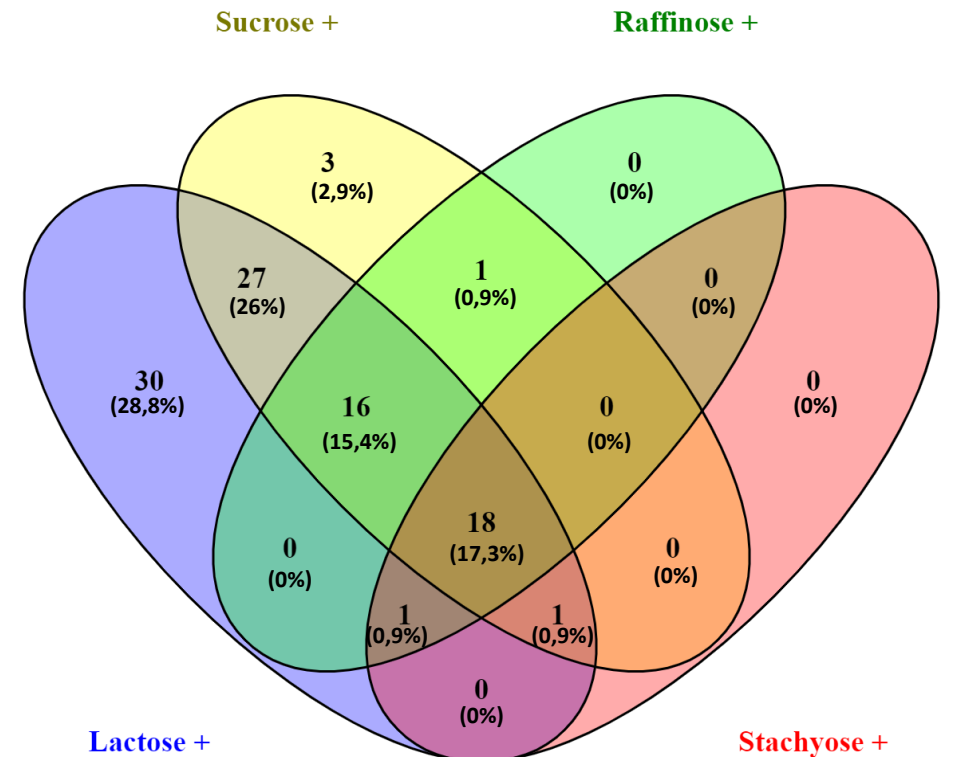
➤ A quest for 2-in-1 bacteria



➤ Screening 104 strains for the ability to ferment plant or milk carbohydrates



	Number of strains	Lactose +	Sucrose +	Raffinose +	Stachyose +	lac-, suc-, raf-, sta-	lac+, suc+, raf+, sta+
<i>P. freudenreichii</i>	10	8	2	1	0	2	0
<i>A. acidipropionici</i>	10	10	10	9	7	0	6
<i>L. delbrueckii</i> subsp. <i>bulgaricus</i>	8	8	0	1	1	0	0
<i>L. delbrueckii</i> subsp. <i>lactis</i>	10	10	8	2	2	0	2
<i>L. plantarum</i>	12	12	12	12	5	0	6
<i>L. rhamnosus</i>	11	7	5	1	0	4	0
<i>S. thermophilus</i>	10	9	10	0	0	0	0
<i>L. fermentum</i>	8	7	8	7	2	0	1
<i>L. helveticus</i>	12	10	1	0	0	1	0
<i>L. acidophilus</i> / <i>L. johnsonii</i>	4	3	3	3	3	1	3
<i>Lc. Lactis</i>	9	9	7	0	0	0	0
Total number	104	93	66	36	20	8	18
%	100.0	89.4	63.5	34.6	19.2	7.7	17.3



➤ Screening 104 strains for the ability to acidify goat milk and vegetable milk analogs



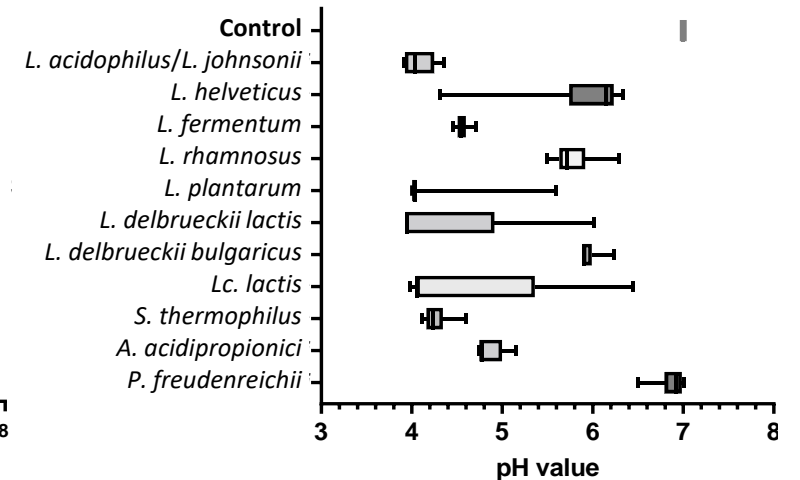
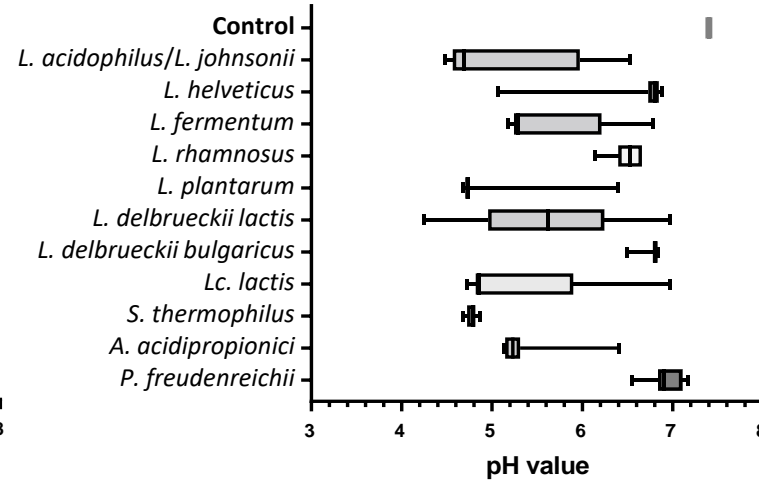
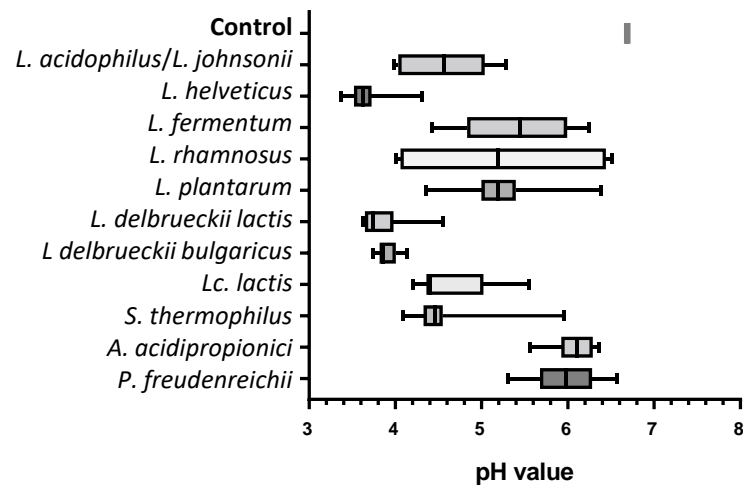
Goat milk



Soy milk analog



Hemp milk analog

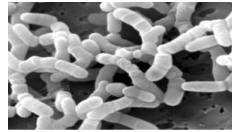


INRAE

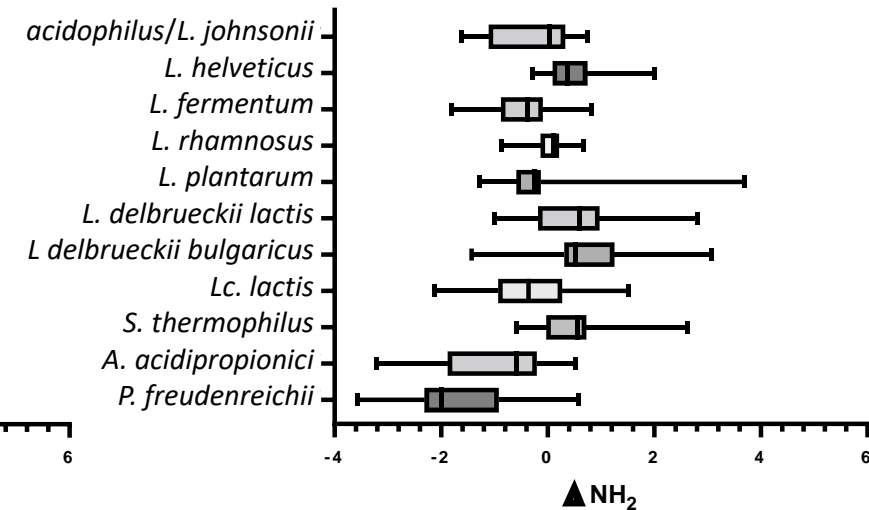
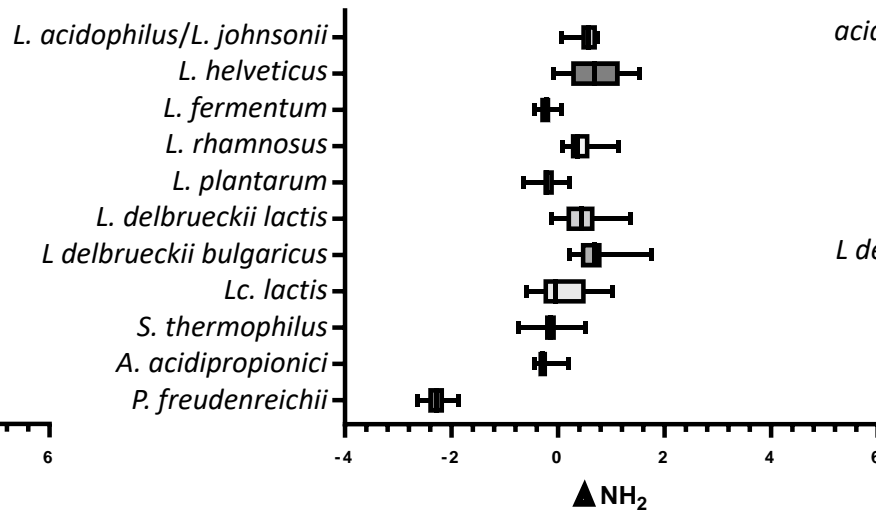
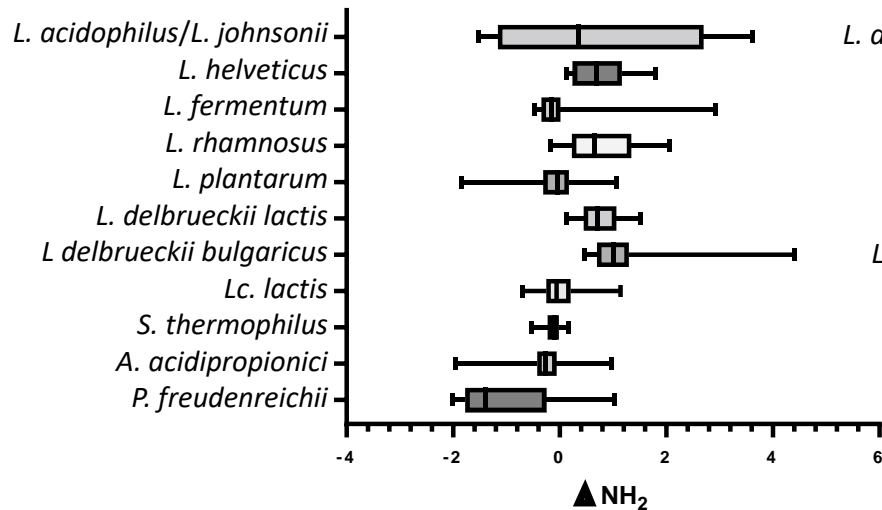
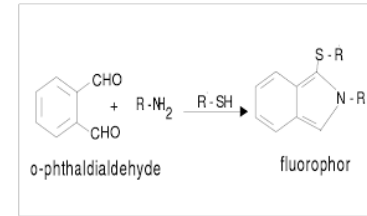
Probiotic fermented products
SFM 2023, Rennes, BZH, G. Jan



➤ Screening 104 strains for the ability to utilize goat milk or vegetable proteins



+

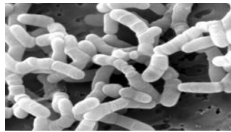


INRAE

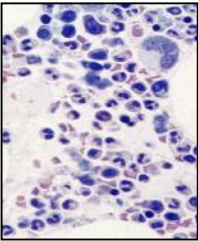
Probiotic fermented products
SFM 2023, Rennes, BZH, G. Jan



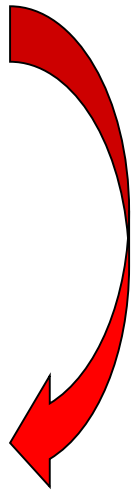
➤ Screening 104 strains for the ability to induce IL-10 in human PBMCs



+



24 h

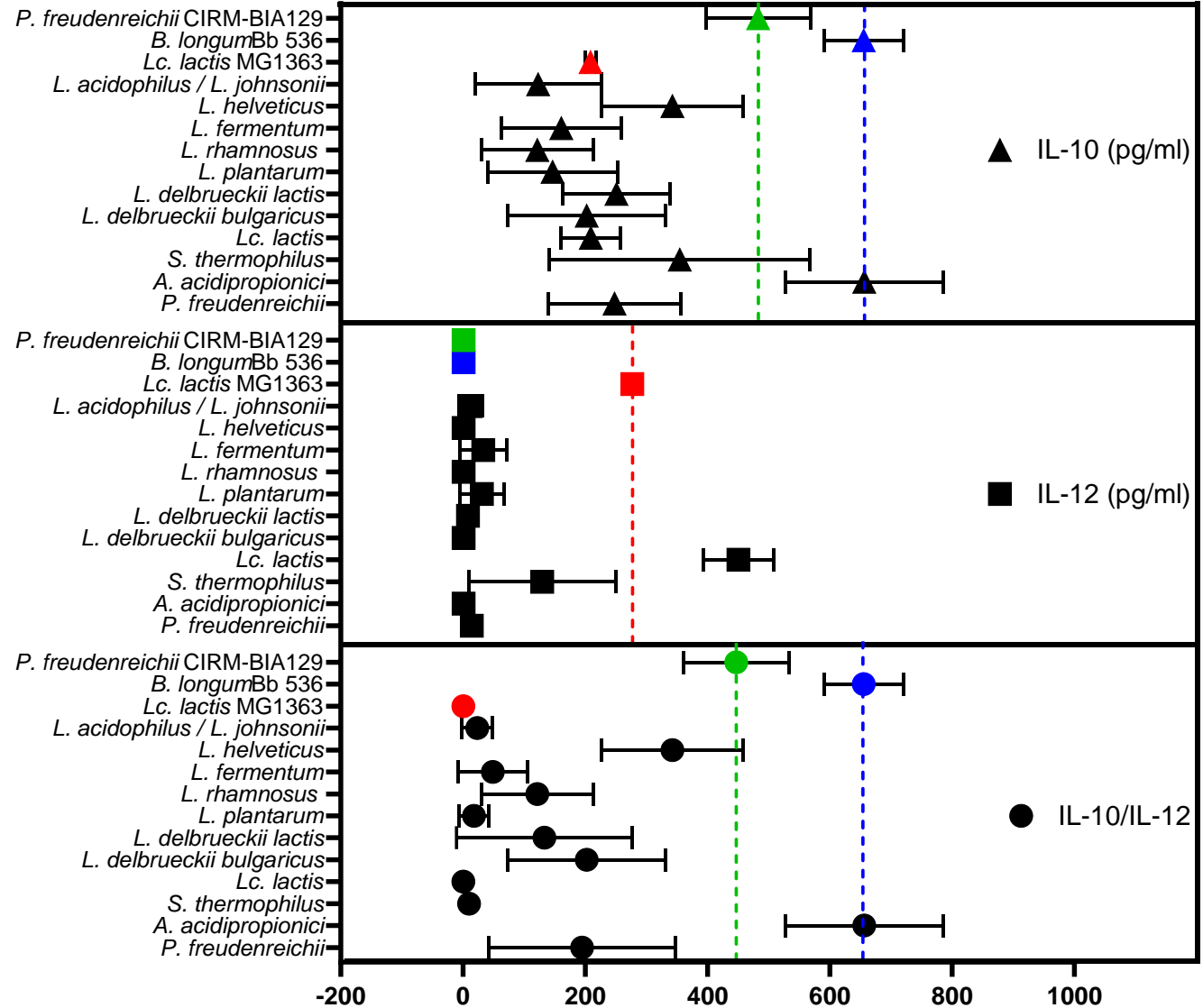


IL-10

IFN γ

IL-12

TNF α

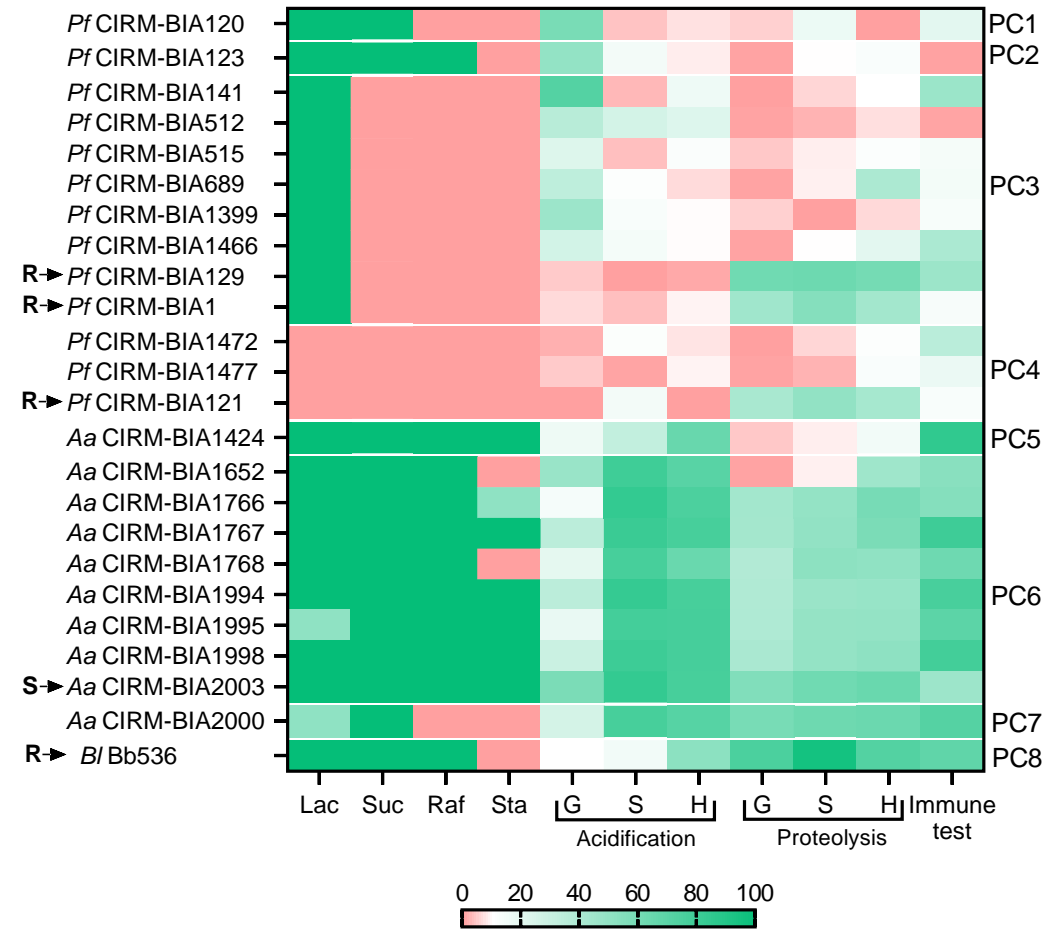


INRAE

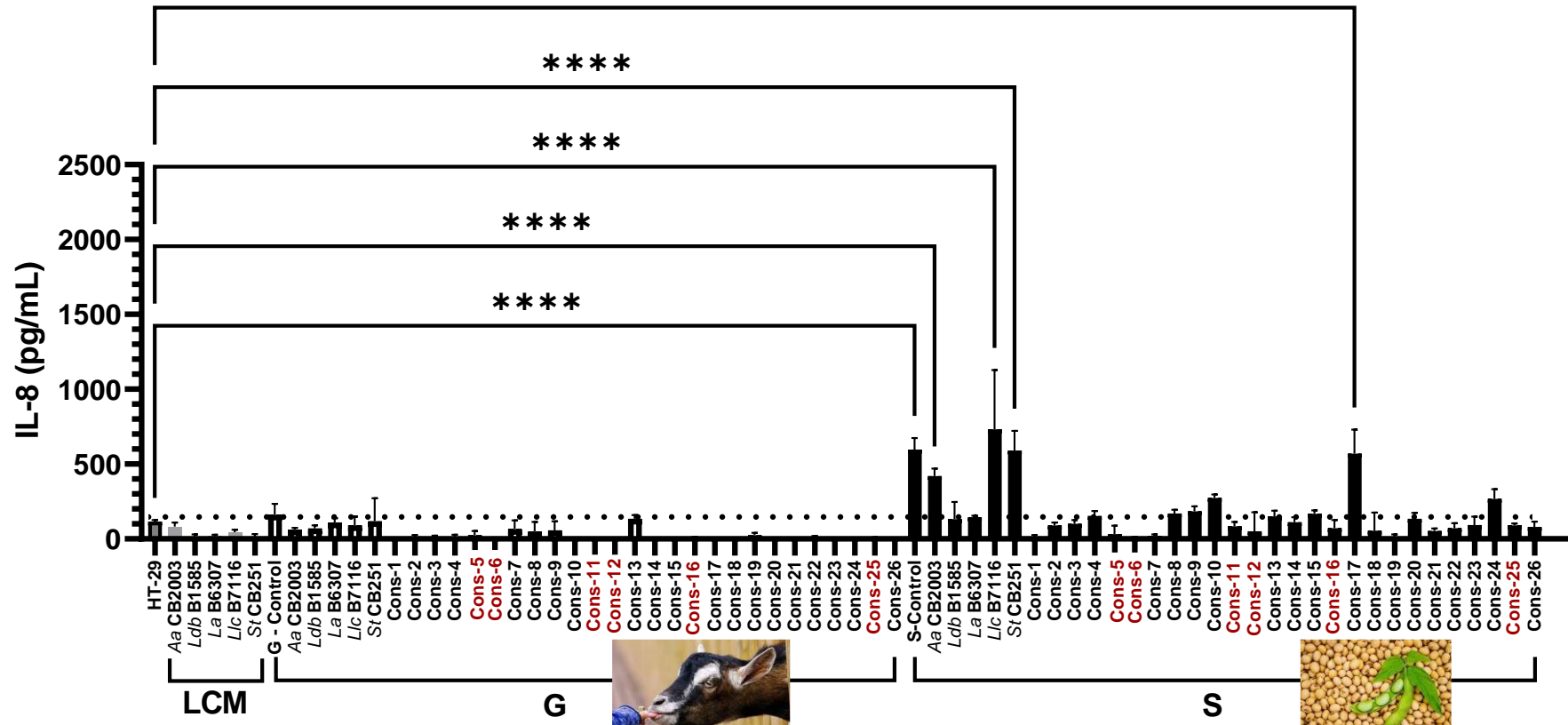
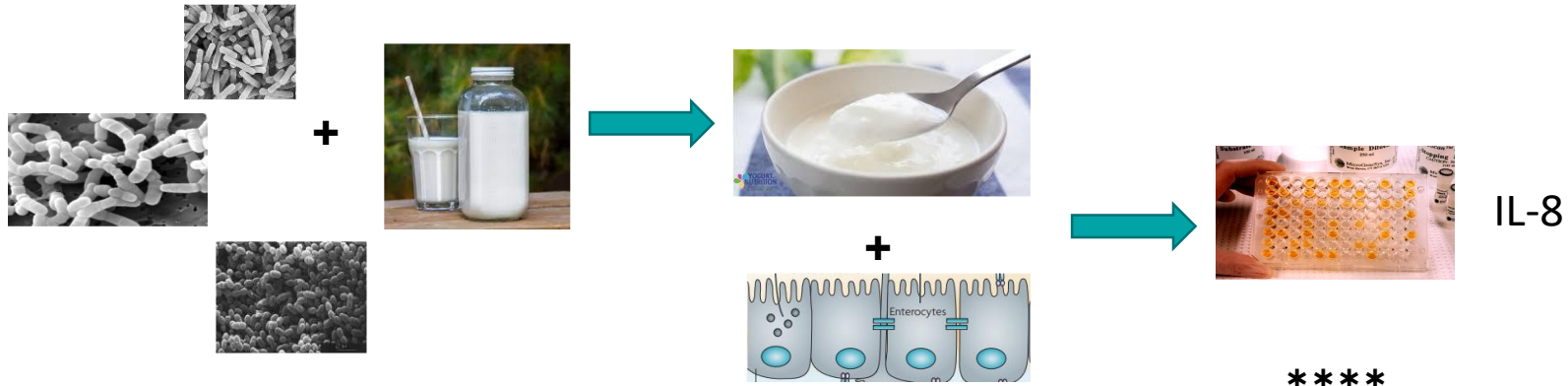
Probiotic fermented products
SFM 2023, Rennes, BZH, G. Jan



➤ Clustering 104 strains according to technological and probiotic abilities



➤ Developing anti-inflammatory fermented vegetable products

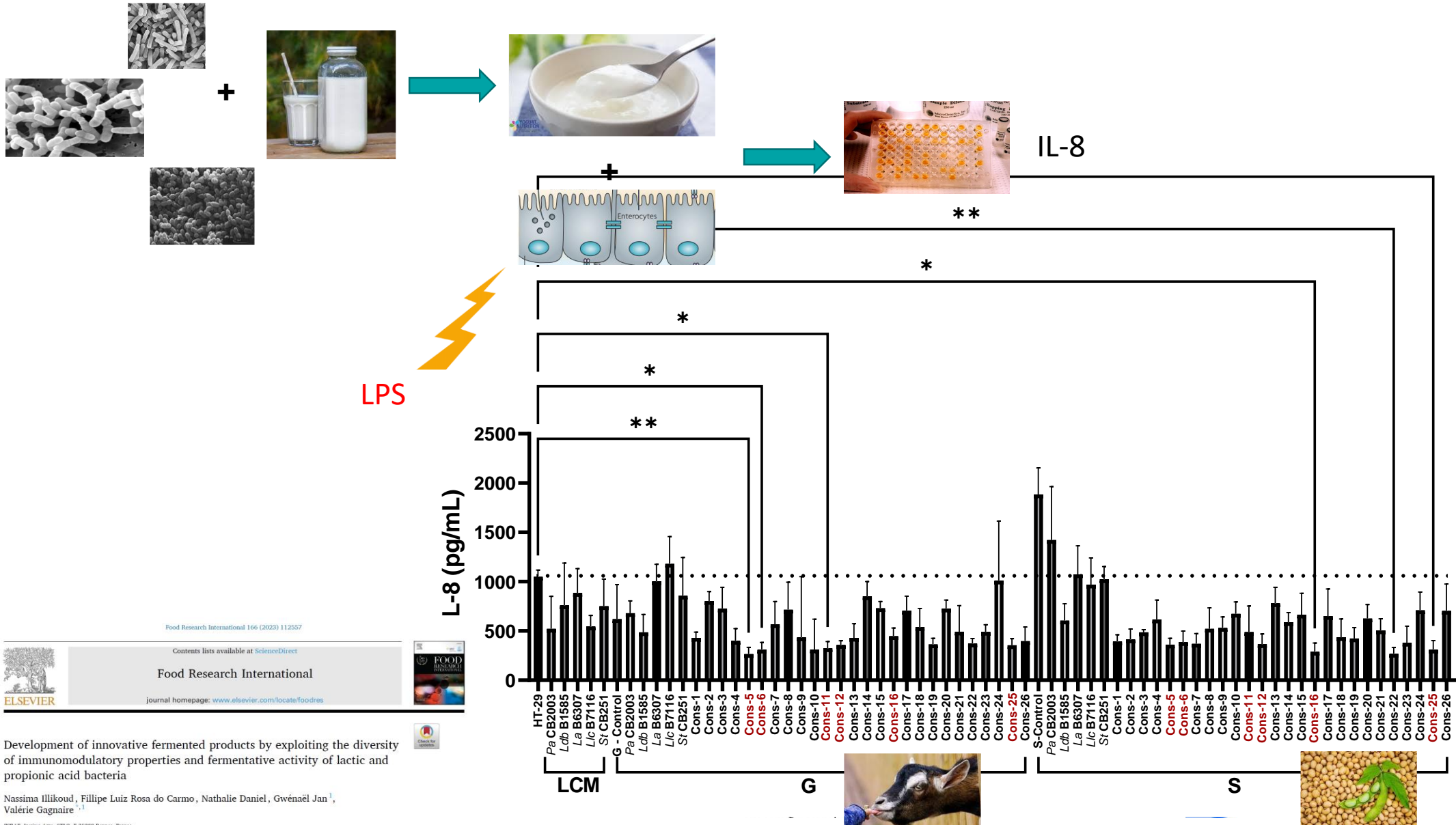


INRAE

Probiotic fermented pr
SFM 2023, Rennes, BZI



➤ Developing anti-inflammatory fermented vegetable products



Development of innovative fermented products by exploiting the diversity of immunomodulatory properties and fermentative activity of lactic and propionic acid bacteria

Nassima Illikoud, Filipe Luiz Rosa do Carmo, Nathalie Daniel, Gwénaél Jan¹, Valérie Gagnaire^{1,*}

➤ Towards preclinical studies

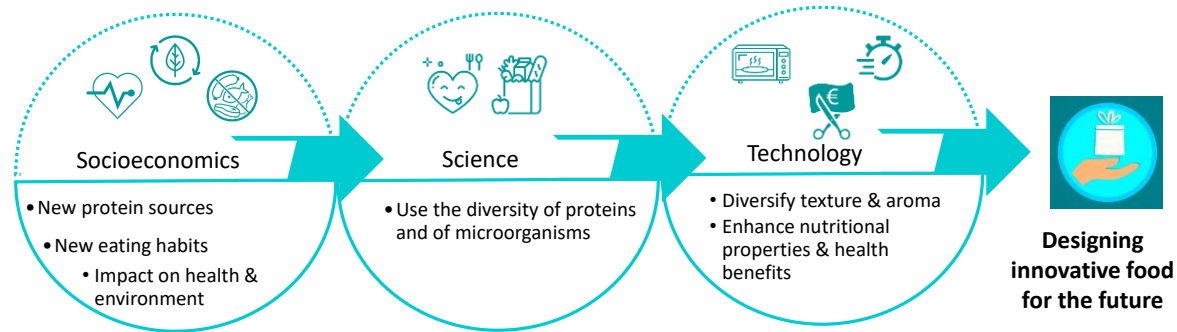


Modèles IBD, IBS

Impact sur l'inflammation

Impact sur la douleur intestinale

Impact sur le microbiote intestinal



Valérie Gagnaire
Valerie.gagnaire@inrae.fr



Nassima Illikoud
nassima.illikoud@gmail.com



Fillipe Luiz Carmo
fillipelrc@gmail.com



INRAE

Probiotic fermented products
SFM 2023, Rennes, BZH, G. Jan



> What next?



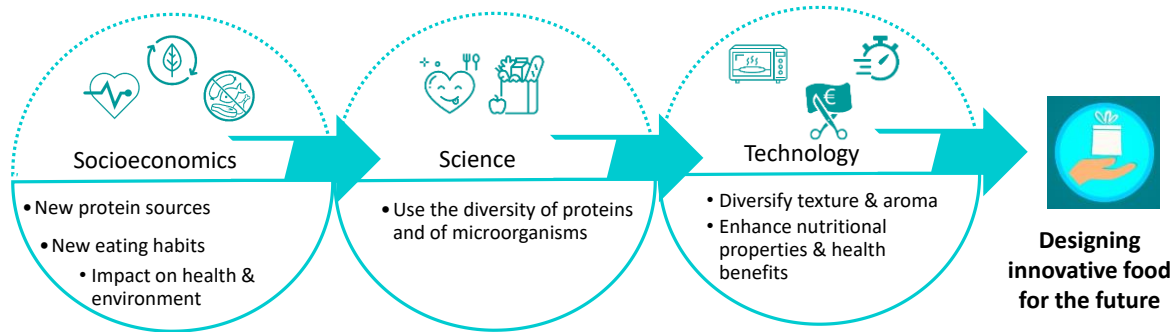
The PRIMA programme is supported and funded under Horizon 2020, the Framework European Union's Programme for Research and Innovation



LOCALNUTLEG
 Developing innovative plant-based added-value food products through the promotion of LOCAL Mediterranean NUT and LEGUME crops



Valérie Gagnaire
 Valerie.gagnaire@inrae.fr



> Thank You for your attention



INRAE

Probiotic fermented products
 SFM 2023, Rennes, BZH, G. Jan

