

FINAL PROGRAM



FoodBooster 2026

Emerging tools to improve our nutritional environment

11 – 13 May 2026 | Liège, Belgium



THE IIS FOODBOOSTER

The IIS FoodBooster has currently more than 70 partners, including some 20 companies.

(Accredited) Research Centres | Research Units



Public partners, non-profit organizations, federations, investment funds, incubators, competitive clusters, ...



Companies: By-product generators



Companies: Producers of functional ingredients



Companies: Others



ORGANIZERS

The **Organizing Committee**, on behalf of the **IIS FoodBooster**, warmly welcomes you to the international conference "**FoodBooster 2026: Emerging tools to improve our nutritional environment**", which will be held from **May 11 to 13, 2026**, in the beautiful "*Cité Ardente*", namely **Liège**, in **Belgium**.

The organization of FoodBooster 2026 was launched by the **IIS FoodBooster**, led by the University of Liège and the CER Groupe. The **IIS FoodBooster** is a collaborative initiative of the Walloon *Smart Specialization Strategy* (S3) focused on advancing the **functional ingredient** sector, encompassing the entire value chain: from the collection and valorization of agri-food by-products to the consumption of functional foods, used in human and animal health. It connects key players from **industry, academia** and **public organizations** to **stimulate innovation**, and support the **development** of environmentally friendly, high-performance **processes and products** that meet the needs of manufacturers, with a particular focus on **prebiotics, probiotics**, and **bioactive peptides**. FoodBooster also plays a central role in enhancing the **visibility** and **competitiveness** of the Walloon functional food sector, both locally and internationally. Feel free to browse our website www.foodbooster.org to learn more!

Organizing Committee



Dr. Nathalie GILLARD
CER Groupe



Prof. Gauthier EPPE
University of Liège



Dr. Wendy MÜLLER
University of Liège



Prof. Yvan LARONDELLE
University of Louvain



Dr. Anne BOUCQUIAU
Belgian Society of Nutrition Physicians



Arnaud COLLETTE
University of Liège

Scientific Committee

- **Anne BOUCQUIAU** (Belgian Society of Nutrition Physicians, Belgium)
- **Gauthier EPPE** (University of Liège, Belgium)
- **Nathalie GILLARD** (CER Groupe, Belgium)
- **Yvan LARONDELLE** (University of Louvain, Belgium)
- **Christophe MATTHYS** (University of Leuven, Belgium)
- **Rozenn RAVALLEC** (University of Lille, France)
- **John VAN CAMP** (Ghent University, Belgium)

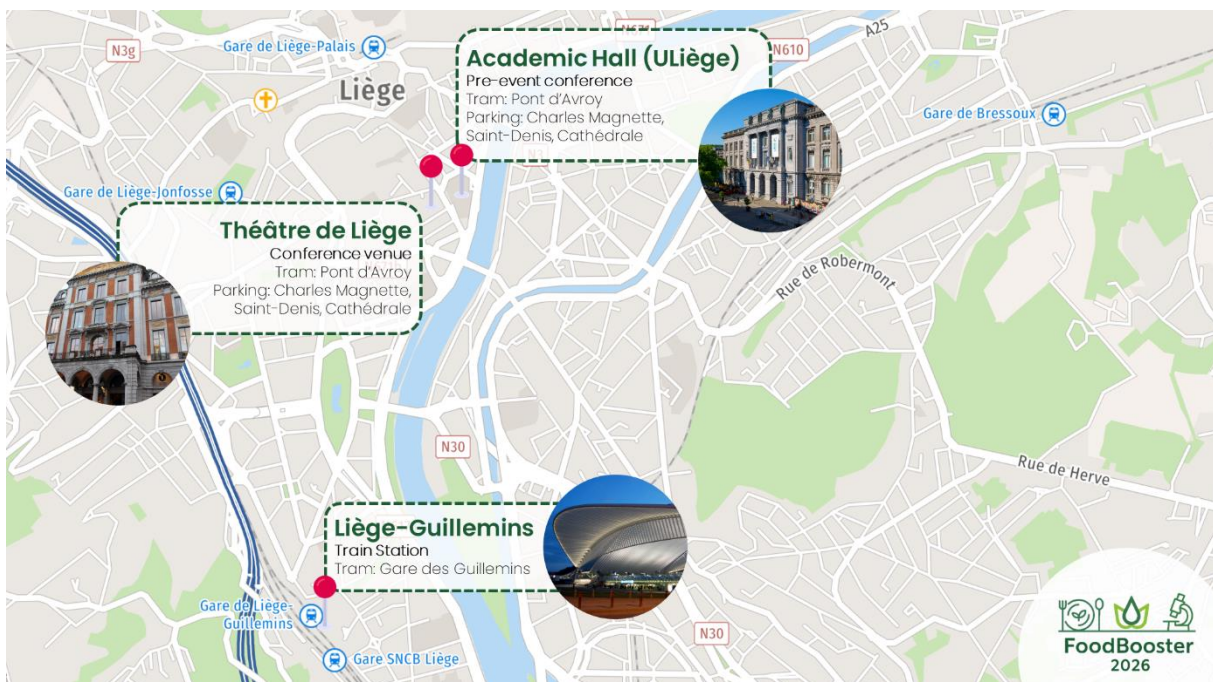
WELCOME TO LIÈGE

FoodBooster 2026 will take place at two distinct locations: the **historic center of Liège** and the **Sart-Tilman campus** of the University of Liège.



Liège – Luik – Lüttich – Lîdje

Liège is a city known for its **rich industrial history** and **dynamic cultural scene**. Situated at the **crossroads of Europe**, the “*Cité Ardente*” connects major European cities, notably thanks to the stunning **Liège-Guillemins** train station. As the **economic capital of Wallonia**, Liège also plays a key role in **driving innovation** and **commerce** in the region, supported by a **strong network** of **research institutions**. During your visit, you can stroll along **the Meuse River**, climb the 374 steps of the “*Montagne de Bueren*”, or enjoy wealth of **culinary traditions**, ranging from iconic local specialties like **Liège waffles** to **Liège meatballs**, not to mention **craft beers** and **péket**! With its warm, welcoming vibe and its blend of tradition and innovation, Liège is the ideal destination to not only attend the **FoodBooster 2026 Event** but also to discover a city brimming with history, creativity, and culinary delights!



Conference Venues

Academic Hall, ULiège

The **Academic Hall** at the **University of Liège** is a **historic** and **prestigious** venue, inaugurated by King William I of the Netherlands in **1817**. Located within the University's main building in the **heart of Liège**, this **protected monument** is one of the most **remarkable** examples of **neoclassical architecture** in the country.



Sart-Tilman Campus, ULiège

The **Sart Tilman Campus** is one of the campuses of the **University of Liège**, located in the **picturesque countryside** just **outside the city center**. Opened in the 1970s, it has since evolved into a **vibrant academic and research hub**, home to **several faculties**, including Science, Engineering, and Medicine, as well as **specialized research centers**, making it a key site for cutting-edge research and innovation.

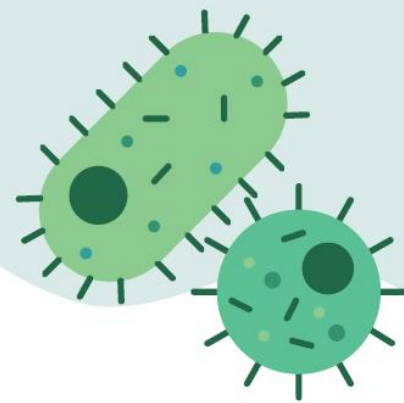
Théâtre de Liège

The **Théâtre de Liège** is a **unique cultural landmark** that blends traditional architecture with modernist touches, reflecting the **dynamic transformation** of the city. Located in the **heart of Liège**, this remarkable venue is a central hub for the city's cultural scene. **Participants of the FoodBooster 2026** scientific conference will have the opportunity to discover three areas of the theater: the *Salle de l'Oeil Vert*, the *Passage des cinquante épaules* and the *Salle au fin cou*.



Getting around the city

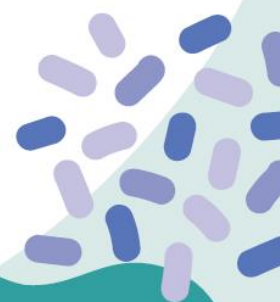
You can easily get around Liège on foot, by bus, or by the new tram. You can purchase your tickets directly via the TEC app, at the ticket machines (SELF) located on each platform, which accept payment by bank card or cash or at TEC Espaces. For more information and to plan your itineraries, visit <https://www.letec.be/>



CONFÉRENCE GRAND PUBLIC

INNOVATIONS EN NUTRITION & SANTÉ

Le microbiote intestinal en ligne de mire



11 mai 2026 · 20h00

Université de Liège
Salle Académique · Pl. du Vingt Août



CONFÉRENCE GRAND PUBLIC DONNÉE PAR

Nathalie Delzenne

Professeure en sciences biomédicales à l'UCLouvain et spécialiste reconnue en nutrition et métabolisme

Inscription gratuite, mais obligatoire
Pour plus d'informations : www.foodbooster.org



CONFÉRENCE ORGANISÉE PAR L'IIS FOODBOOSTER DANS LE CADRE DE L'ÉVÈNEMENT FOODBOOSTER 2026



PROGRAM – DAY 1

Monday 11th May 2026 – Evening session for the general public

Time	Agenda	Venue
19:30 – 21:30	Conférence grand-public <i>Innovations en nutrition et santé : le microbiote intestinal en ligne de mire</i> Prof. Nathalie Delzenne (UCLouvain)	Salle Académique, ULiège Place du XX Août, Liège

Le microbiote est un écosystème constitué de cent mille milliards de bactéries qui « colonisent » notre intestin et jouent un rôle clé en physiologie humaine. Nous lui offrons le gîte, mais également le couvert. En effet, l'alimentation est un des facteurs clés dans l'instauration du microbiote dès la naissance et continue d'influencer notre état de santé tout au long de la vie. Quel est le lien entre nos comportements alimentaires et le microbiote intestinal ? Quelles sont les innovations dans le domaine de la nutrition, basées sur l'évolution des connaissances dans ce domaine ? Ces questions jalonneront l'exposé, qui posera un regard scientifique sur les approches nutritionnelles ou thérapeutiques (probiotiques, prébiotiques) susceptibles de moduler le microbiote intestinal en vue de préserver au mieux la santé et la qualité de vie.

A propos de l'oratrice

Nathalie Delzenne, spécialiste de la nutrition et du métabolisme, est professeure à l'Université catholique de Louvain (UCLouvain). Ses recherches se concentrent sur l'impact de l'alimentation et des micro-organismes intestinaux sur la santé, en particulier en lien avec les maladies métaboliques et comportementales. Reconnue pour ses travaux innovants, elle s'intéresse à la manière dont les habitudes alimentaires en lien avec le microbiote intestinal peuvent influencer notre santé. Dans cette conférence, elle partagera son expertise pour mieux comprendre les enjeux nutritionnels actuels et leur impact sur la santé.



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Informations pratiques

19h30 : Accueil et ouverture des portes

20h00 : Début de la conférence

21h00 : Questions – Réponses

21h30 : Fin de la conférence

PROGRAM – DAY 2

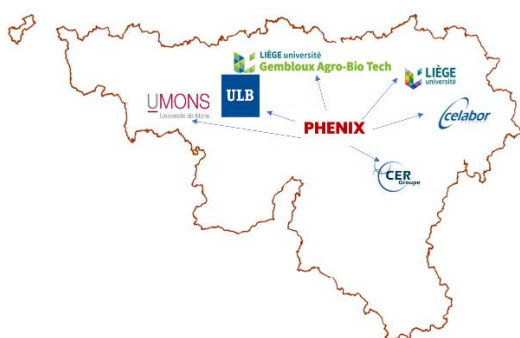
Tuesday 12th May 2026 – Lab tours & Social activity

Time	Agenda	Venue
12:00 – 12:30	Lunch & Registration	Sart-Tilman Campus B4 Building – <i>Amphithéâtres de l'Europe</i> – Hall <i>Boulevard du Rectorat 13, 4000 Liège</i>
12:30 – 13:00	Presentation of the PHENIX platforms and associated research projects	B4 Building – Room 0/90
13:00 – 17:30	Visit of the PHENIX platforms	Mass Spectrometry Laboratory (B6c) Center for Protein Engineering (B6a) FARAH Research Centre (B43B)
18:30 – 19:30	Social Activity Guided tour of Liège	Liège City center <i>Meeting point: Place du XX Août</i>

LAB TOURS: VISIT OF THE PHENIX PLATFORMS

The **PHENIX project** portfolio, funded by the European Regional Development Fund (**ERDF**), is a **structuring** and **multidisciplinary** project, which aims at **consolidating analytical platforms** and **technological facilities** in **Wallonia** in the field of **agri-food** and **innovative biotechnologies**.

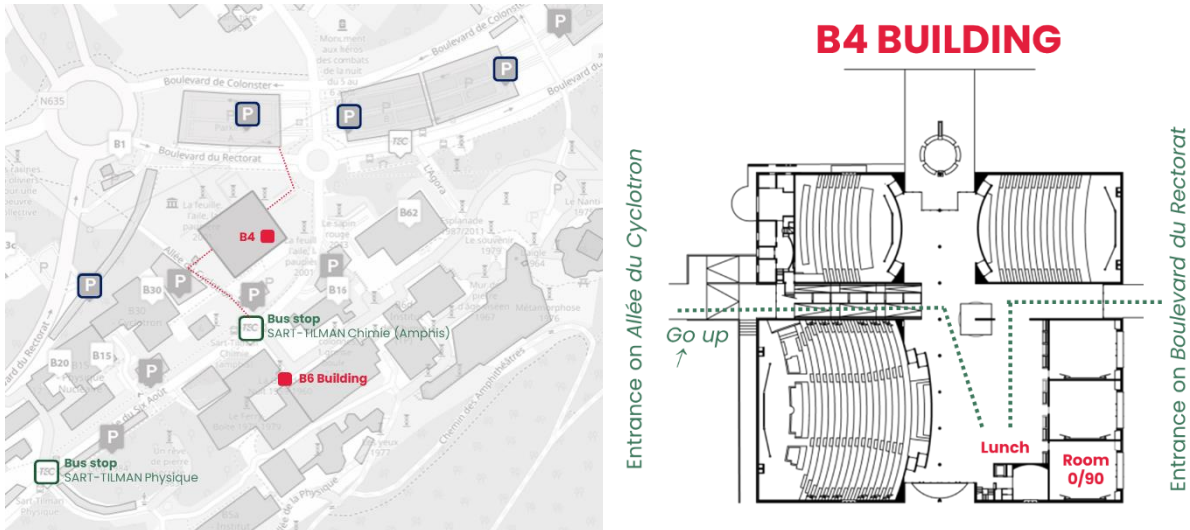
This project is highly connected with the **Strategic Innovation Domain** “Agri-food chains of the future and innovative management of the environment” (DIS 5) of the Walloon **Smart Specialization Strategy**, and hence, to the **IIS FoodBooster** behind the organization of this event.



The PHENIX project brings together a **network** of **hybrid platforms** hosted within three **universities** of the Wallonia-Brussels Federation (ULB Gosselies, ULiège, and UMONS) and two **research centers** (Celabor and CER Groupe), with a **unifying** and **cross-disciplinary vision** aligned with the DIS 5. In total, **15 platforms** and **15 research teams** are involved in this project.

The main objective of the project is to **strengthen existing centers of excellence** within the partner university institutions and research centers, all recognized at the European level, in order to **provide Walloon companies** (located in ERDF-eligible areas) with **high-performance tools** and the **appropriate expertise**, which most of them cannot acquire on their own. The acquisition of **10 analytical instruments** and **10 pieces of technological equipment**, which are unique and remarkable, is planned during the project.

Lunch and registration will take place from 12:00 to 12:30 in the **B4 “Europe” Building**, as well as the presentation of the PHENIX platforms and associated projects (from 12:30 to 13:00, Room 0/90). The route to get there will be signposted from the “Chimie (Amphis)” bus stop, as indicated on the map below. **Bus stops** and **parking lots** are located near the B4 building.



You will then be guided around the campus by our guides, that's why **it's important that you be on time**. A **shuttle bus** will take you from the B6 Building to the FARAH research center, and then **to the city center** at the end of the visits.

You can find the map of the Sart-Tilman Campus at: https://www.campus.uliege.be/cms/c_5876474/fr/campus-de-liege-sart-tilman-agera (B4 & B6 Buildings), and https://www.campus.uliege.be/cms/c_5876493/fr/campus-de-liege-sart-tilman-vallee (B43B Building).

If you are lost or running late, please do not hesitate to contact us at: foodbooster@uliege.be

SOCIAL ACTIVITY



After the visit of the PHENIX platforms, you will have the chance to **discover a little more of the city of Liège** through a **one-hour guided tour**. You will discover the rich history of Liège through its historic center, and its iconic sites like the Palace of the Prince-Bishops, the now-defunct Saint Lambert Cathedral, the Town Hall and the Perron, and hear fascinating tales about this vibrant city's past!

PROGRAM – DAY 3

Wednesday 13th May 2026 – Scientific Conference

Venue: Théâtre de Liège, Place du XX Août 16, Liège

Time	Agenda
08:30 – 09:00	Registration & Coffee
09:00 – 09:15	Welcome, Opening Remarks & Presentation of the IIS FoodBooster Gauthier Eppe (ULiège) & Nathalie Gillard (CER Groupe), co-leaders of the IIS FoodBooster
SESSION ONE chaired by Gauthier Eppe (ULiège) and Yvan Larondelle (UCLouvain)	
09:15 – 09:40	The 2022-2023 Belgian Food Consumption Survey Nicolas Berger (Sciensano, Belgium)
09:40 – 10:05	The new dietary recommendations for Belgium Hélène Alexiou (HE Vinci and Superior Health Council, Belgium)
10:05 – 10:20	Flash Poster Presentations 1 – 9
10:20 – 11:00	Coffee Break & Poster session
SESSION TWO chaired by John Van Camp (UGent) and Nicolas Berger (Sciensano)	
11:00 – 11:10	Development of functional foods as a strategy to improve consumers' health and compliance with the dietary recommendations Yvan Larondelle (UCLouvain, Belgium)
11:10 – 11:35	Glance on the Regulatory Framework on Novel Foods and Nutrition and Health Claims Isabelle Laquiere (Federal Public Service Health, Food Safety and Environment, Belgium)
11:35 – 11:55	THEMATIC SESSION: PROBIOTICS & PREBIOTICS <i>Rigorous donor recruitment strategies for in vitro probiotic and human gut microbial simulation studies: Insights from the GUTBooster project, Brunette Katsandegwaza (University of Liège, Belgium)</i> <i>Development of a HILIC-FLD-MS/MS method for the characterization of galacto-oligosaccharides (GOS) generated by recombinant β-galactosidases, Lucia Cocorullo (CER Groupe, Belgium)</i>
11:55 – 12:15	INDUSTRY SESSION #1: Recent scientific achievements by companies of the IIS FoodBooster <i>Innovative probiotic solutions for food supplements, François Heroufousse (Superbiotics)</i> <i>From the Microbiota to GLP-1: The Surprising Effect of Inulin on Our Metabolism, Raphaël Bloquet (Cosucra)</i>
12:15 – 12:30	Flash Poster Presentations 10 – 17
12:30 – 13:50	Lunch, Poster Session & Group Photo
SESSION THREE chaired by Nathalie Gillard (CER) and Rozenn Ravallec (University of Lille)	
13:50 – 14:15	Plant Bioactives and Gut Health Kieran Tuohy (University of Leeds, UK)
14:15 – 14:40	Protein gastrointestinal digestion and peptide intestinal sensing Isidra Récio (Institute of Food Science Research, CSIC-UAM, Spain)

Time	Agenda
14:40 – 15:10	THEMATIC SESSION: BIOACTIVE PEPTIDES <i>PEPTIBoost: Development of a comprehensive and versatile platform for the generation of protein hydrolysates containing bioactive peptides to boost the functional food sector</i> , Ana I. Fernandez Salina (CER Groupe, Belgium) <i>Multi-dimensional analytical approach for the identification of bio-active peptides</i> , Evan Seyssens (ULiège, Belgium) <i>Purple phototrophic bacteria as a sustainable protein source: bioaccessibility and functional responses during in vitro digestion</i> , Malou Nuyts (UGent, Belgium)
15:10 – 15:50	Coffee Break & Poster Session
SESSION FOUR chaired by Nathalie Gillard (CER) and Gauthier Eppe (ULiège)	
15:50 – 16:10	INDUSTRY SESSION #2: Recent scientific achievements by companies of the IIS FoodBooster <i>The nutritional impact of sprouting on bioaccessible minerals and future perspectives</i> , Claire Van Der Aa (Puratos) <i>From Mechanistic Synergy to Clinical Translation: An Innovative Fructan-HMO Combination for Toddler Nutrition</i> , Maria Pudenz (BENEO GmbH)
16:10 – 16:35	Evolution of nutritional Life Cycle Assessment (nLCA) and associated opportunities for the food sector Graham McAuliffe (Harper Adams University, UK)
16:35 – 16:55	THEMATIC SESSION: EMERGING APPROACHES <i>Using Life Cycle Assessment to guide the development of sustainable protein ingredients: the PROTEBoost case study</i> , Olivier Talon (Materia Nova, Belgium) <i>Protein digestibility (using stable isotope studies) in patients with obesity and/or bariatric surgery</i> , Gabriël Johannes Eksteen (KU Leuven, Belgium)
16:55 – 17:10	Conclusion & Perspectives Michel Moutschen (Vice-Rector for Research, University of Liège, Belgium)
17:10 – 17:25	Closing, Thanks & Awards
17:25 – 19:30	Farewell Drink

POSTERS

#	Poster title	Presenting author
1	Developing a Method for Biomarker Identification in Longitudinal Studies: Integrating SIFT-MS Full-Scan and Targeted Analyses	Axel Mercier, Multitel (Belgium)
2	Developing Innovative, Nutrient Rich Functional Foods from Local Aronia	Emeline Dierge, UCLouvain (Belgium)
3	Valorisation of by-products in human nutrition: the example of rapeseed meal	Jonas Spinewine, UCLouvain (Belgium)
4	Nutritional characterization, storage stability and valorization of walnut press cake	Pauline Debisshop, UCLouvain (Belgium)
5	Oxidative stability of walnut oil supplemented with rosemary extract under real storage and domestic use conditions	Pauline Debisshop, UCLouvain (Belgium)
6	Valorization of Bovine Colostrum for the Production of HMO-Like Prebiotic Oligosaccharides	Maroua Kammoun, CER Groupe (Belgium)
7	A Breakthrough in Allergy Management: Could the Synbioceutical® Concept Be a Game Changer?	Olivier Raimond, BellaVie SRL (Belgium)
8	From grape pomace to prebiotics: Structural characterization of pectic oligosaccharides using a UHPLC-FLR-cIMS-HRMS workflow	Thomas Tilmant, CER Groupe (Belgium)
9	Assessment of the Allergenicity of Alternative Proteins	Maxime Gavage, CER Groupe (Belgium)
10	Development of an In Vivo Mouse Model to Assess the Potential Allergenicity of Alternative Proteins	Lucie Poncelet, CER Groupe (Belgium)
11	Development and validation of an UHPLC-MS/MS method for the identification and quantification of fructooligosaccharides from Yacón root and culture supernatants	Niko Eichten, CER Groupe (Belgium)
12	Unlocking the Power of Green Lentil Proteins: A New Source of Bioactive Peptides	Cyril Michel, ULiège (Belgium)
13	In vivo and in vitro protein and amino acid digestibility of plant-based foods and ingredients	Beatriz Miralles, CSIC-UAM Institute of Food Science Research CIAL (Spain)
14	Honey from the stingless bee <i>Tetragonisca angustula</i> as a novel source of potentially beneficial bacteria	Elaine De Martinis, Ribeirão Preto School of Pharmaceutical Sciences - University of São Paulo (Brazil)
15	Evaluating the digestive profile and microbiota-driven health effects of locally produced fruits in the Greater Region	Ninive Montserrat Aguilar Trujillo, ULiège (Belgium)
16	Enzymatic predigestion of whey to assess its impact on gut microbiota using in vitro digestion models	Manon Gresse, ULiège (Belgium)
17	Are probiotics a safe and efficient potential alternative to metronidazole for the treatment of bacterial vaginosis? A unique preliminary study	Olivier Raimond, BellaVie SRL (Belgium)

INVITED SPEAKERS – ABSTRACTS

The 2022–2023 Belgian Food Consumption Survey

Nicolas Berger (Sciensano, Belgium)

National food consumption surveys are fundamental to nutrition epidemiology, providing the empirical basis for dietary risk assessment, guideline development, and public health policy. In Belgium, the National Food Consumption Survey constitutes a core component of the national health information system, generating detailed and nationally representative data on food consumption, nutrient intake, and dietary patterns. Repeated survey waves conducted in 2004, 2014–2015 and 2022–2023 enable robust assessment of temporal trends and evolving nutritional challenges.



The most recent survey was conducted in a representative sample of the Belgian population using a multistage design stratified by age, sex and region. Dietary intake was assessed using repeated 24-hour dietary recalls administered by trained interviewers, supported by standardized tools and portion size estimation aids, and complemented by a food propensity questionnaire to better capture usual intake of episodically consumed foods. Habitual intake distributions were estimated using the SPADE (Statistical Program to Assess habitual Dietary Exposure) modelling approach, allowing correction for within-person variability and appropriate estimation of population intake distributions.

Trend analyses over the past two decades reveal a complex dietary transition. Improvements are observed for selected behaviors, including increased vegetable and water consumption and reductions in sugar-sweetened beverages, fats and oils, and red meat intake. However, these changes are insufficient to offset persistent structural imbalances in dietary patterns. Intakes of key food groups, including fruit, whole grains, fish and dairy products, remain suboptimal or have declined over time.

These patterns are mirrored at the nutrient level. The contribution of total and saturated fat to energy intake is high and increasing, whereas carbohydrate intake is declining. Inadequate intakes are observed for several essential micronutrients, including vitamins A, B-group vitamins, vitamin C, calcium and iron, while sodium intake remains elevated despite modest reductions.

Overall, these findings underscore the importance of repeated, methodologically robust dietary surveillance to characterize population intake distributions and monitor trends. The Belgian National Food Consumption Survey provides critical evidence to inform risk assessment and guide targeted nutrition policies aimed at improving diet quality and reducing health inequalities.

INVITED SPEAKERS – ABSTRACTS

The new dietary recommendations for Belgium

Hélène Alexiou (HE Vinci and Superior Health Council, Belgium)



In 2025, Belgium has released a new set of dietary recommendations. These updated recommendations give insight on the food categories most strongly linked to morbidity, premature mortality and overall disease burden. Drawing on the latest scientific evidence, they outline clear priorities to help prevent chronic diseases and support long term health.

The recommendations also take a fresh look at alcohol consumption and ultra-processed foods, two topics at the heart of today's public health debates. Beyond individual food groups, the work explores broader themes: how different dietary patterns influence health, and how our food choices impact the environment.

The subsequent presentation will examine each of these elements in greater depth.

Development of functional foods as a strategy to improve consumers' health and compliance with the dietary recommendations

Yvan Larondelle (UCLouvain, Belgium)

Functional foods, as well as food supplements, should not stimulate consumers to stay away from the dietary and nutritional recommendations but should rather help them getting as close as possible to these recommendations. These innovative products might also contribute to the improvement of well-being and help prevent inflammatory and chronic diseases. Research and innovative development must be conducted with this in mind in order to have a significantly positive impact on public health.



INVITED SPEAKERS – ABSTRACTS



Glance on the Regulatory Framework on Novel Foods and Nutrition and Health Claims Isabelle Laquiere (Federal Public Service Health, Food Safety and Environment, Belgium)

Introduction: The European Union (EU) maintains strict regulations for novel foods and for nutrition and health claims to ensure food safety and truthful consumer information. This presentation provides an overview of these frameworks.

Objectives: To outline key legal provisions and procedures for novel foods and for nutrition and health claims in the EU covering novel food criteria and authorization, claim evaluation and approval processes, and the roles of industry and authorities.

Methods: Review of EU legislation (Regulation (EU) 2015/2283 on novel foods and Regulation (EC) 1924/2006 on nutrition and health claims, available national and EU guidelines and FAQs. Case examples illustrate the application of these complex rules.

Results: Under the novel foods regulation, any food not significantly consumed in the EU before 15 May 1997 (and fitting defined categories) is considered a novel food. Such foods must undergo a centralized EU safety assessment and authorization before marketing. EFSA evaluates safety (risk assessment) and the European Commission and Member States decide on approval (risk management). A simplified notification process exists for traditional foods from outside the EU with a history of safe use. Regulation (EC) 1924/2006 similarly mandates that nutrition and health claims on foods be pre-authorised based on scientific substantiation. This regulation is the legal framework used by food business operators when they want to highlight the particular beneficial effects of their products, in relation to health and nutrition, on the product label or in its advertising. Food business operators (FBOs) are responsible for compliance: they must determine if ingredients are novel (seeking authorization if so) and ensure only permitted claims are used.

Conclusions: The EU's novel food and health claim rules protect consumers by ensuring that novel food ingredients are safe and to ensure that any claim made on a food's labelling, presentation or advertising in the European Union is clear, accurate and based on scientific evidence. Early consideration of these requirements is essential for innovators. Robust evidence and adherence to procedures are critical for approval. The rigorous involvement of EFSA and the European Commission in risk assessment and management enables novel food innovation while safeguarding public health.

INVITED SPEAKERS – ABSTRACTS

Plant Bioactives and Gut Health Kieran Tuohy (University of Leeds, UK)

Plant-derived bioactive compounds such as polyphenols, play a key role in modulating gut health through effects on intestinal barrier function, inflammation, and the gut microbiome. However, their applications as functional food ingredients is often limited by lacking stability during processing, storage, as well as gastrointestinal digestion. Current work focuses on microencapsulation as a key strategy to enhance the stability, delivery, and bioefficacy of plant bioactives. The research utilizes bioactive-rich fractions recovered from fruit and vegetable processing sidestreams, which are microencapsulated using spray-drying and freeze-drying technologies, with a range of carrier matrices selected to protect and stabilize the bioactive compounds.



Encapsulation improved stability under food-relevant conditions and increased degradation resistance during simulated gastrointestinal digestion compared with non-encapsulated counterparts. Effects on the gut microbiome were determined using the in vitro MiGut fermentation model, revealing significant alterations in colonic fermentation patterns and metabolite production. Experiments using Caco-2 intestinal cells demonstrated potent, dose-dependent effects of selected bioactives to lower gut inflammatory response. Overall, this research highlights the potential of combining sidestream valorization and microencapsulation technologies to develop sustainable, value-added functional food ingredients with targeted benefits for gut health.

INVITED SPEAKERS – ABSTRACTS



Protein gastrointestinal digestion and peptide intestinal sensing

Isidra Récio

Institute of Food Science Research, CIAL (CSIC-UAM, CEI UAM+CSIC), Madrid, Spain

Co-authors: *Marta Santos-Hernández, Santiago-Maria Vivanco-Maroto, Pablo Jiménez-Barrios, Cynthia Fontes-Candia, Marta Martínez-Sanz, Beatriz Miralles*

Understanding the mechanisms that connect food gastrointestinal digestion, nutrient sensing at the gut, and satiety signalling are crucial to design foods with an adequate physiological response. Products derived from protein digestion have a potent effect on gastrointestinal-released hormones, but while the mechanisms of carbohydrate sensing are better understood, those for protein and lipid sensing are less well-defined. This presentation will focus on protein digestion and the role of protein digestion products as signalling molecules in the gastrointestinal tract. Because protein digestion can be modulated by food processing technologies, it would be possible to control hormonal response intake by regulating food digestion through different approaches. Examples will be provided from studies using in vivo digests collected from different regions of the gastrointestinal tract (duodenum and jejunum) following the ingestion of milk proteins and their hydrolysates. The impact of interactions between proteins and other food components, such as polysaccharides, will also be discussed, including recent work on polysaccharide-casein gel-like structures capable of altering protein digestion dynamics. Hormonal responses elicited by gastrointestinal digests and individual peptides will be examined in enteroendocrine cells and jejunal organoids. Peptides released during digestion act as potent hormone inducers in STC-1 cells, and inhibition studies confirm the involvement of CaSR and GPR93 receptors. Protein-peptide docking and molecular dynamics were used to predict food-derived peptides able to bind and activate CaSR. However, our findings also suggest the participation of additional receptors and/or transporters, highlighting the complexity of protein-derived signalling pathways in the gut.

INVITED SPEAKERS – ABSTRACTS

Evolution of nutritional Life Cycle Assessment (nLCA) and associated opportunities for the food sector

Graham McAuliffe (Harper Adams University, UK)

Nutritional Life Cycle Assessment (nLCA) has developed rapidly in response to growing recognition that comparative environmental assessments of foods are often incomplete without consideration of the nutritional functions they provide. This presentation traces the evolution of nLCA from its foundations in attributional LCA practice to its current position as a promising yet methodologically unsettled field. The historical development of LCA is outlined alongside the drivers that have accelerated interest in nutrition-integrated approaches, including mandatory sustainability reporting, shifts in consumer expectations, and the expansion of voluntary ecolabelling schemes. These developments have highlighted both the potential and the risks of applying LCA to foods without adequate nutritional framing.



The presentation examines the conceptual and practical challenges that have shaped nLCA's trajectory, including the absence of formal standards, the limitations of existing nutritional functional units, and the consequences of relying on secondary nutrient composition data. Recent efforts to address these issues are discussed, such as early FAO guidance, the development of more robust nutrient profiling tools, and the increasing use of primary data to improve representativeness and reduce bias. Case studies illustrate how assumptions, data choices, and functional unit selection can materially influence conclusions about the relative sustainability of foods.

The final part of the discussion considers emerging opportunities for nLCA as the field moves toward greater methodological maturity. These include wider integration of bioavailability and digestibility into nutritional metrics, the expansion of enviro-nutritional indices, and the need for deeper collaboration between nutrition science, environmental modelling, and industry partners. Collectively, these developments point toward a future in which nLCA can provide more reliable and policy-relevant insights into the sustainability of food systems whilst avoiding pitfalls that characterise its early applications.

THEMATIC SESSIONS – ABSTRACTS

Probiotics & Prebiotics

Rigorous donor recruitment strategies for in vitro probiotic and human gut microbial simulation studies: Insights from the GUTBooster project

Brunette Katsandegwaza¹, Irma Gonza¹, Céline Antoine¹, Cindy Staerck²,
Martine Schroyen³, Patrice Filée², Véronique Delcenserie¹

¹ Laboratory of Food Quality Management, Department of Food Sciences, FARAH - Veterinary Public Health, University of Liège, 4000 Liège, Belgium.

² CER Groupe, Belgium.

³ Animal Sciences, TERRA Teaching and Research Centre, Gembloux Agro-Bio Tech, University of Liège, 5030 Gembloux, Belgium

bkatsandegwaza@uliege.be

Introduction: The complex interaction between the gut microbiome and the host is significant to gut health research. A better understanding of how the gut microbiome directly, or indirectly, impacts different conditions is of major interest to parties from different aspects of research. Equally important is elucidating how internal and external factors shape the microbiome itself, knowledge that could ultimately enable the manipulation of the gut microbiome for therapeutic or preventive purposes. Although studies demonstrate significant differences in the gut microbiome of individuals clustering along lifestyle, diets, genetic background, health conditions and extent of physical activity, studies into how these different clusters respond to an identical microbial modulating treatment (probiotic) are becoming of great interest in the microbiome field.

Objectives: To engineer and evaluate a *Lactiplantibacillus plantarum* mutant with enhanced mucin adhesion.

Methods and Results: Through use of a human gut simulation model, we recently demonstrated a differential response to a probiotic, *L.p. plantarum*, from 3 donors meeting a 'healthy' donor criterion. Donor 2 presented with a significantly different microbial profile compared to Donor 1 and Donor 3 at baseline. Furthermore, samples from Donor 2, who comes from an athletic background, clustered separately from the other 2 donors after probiotic treatment. The same donor exhibited increased propionic and lactic acid production before and after probiotic treatment, with a significantly truncated butyrate acid signature. Interestingly, fermentation of Donor 2 fecal material after probiotic treatment in the SHIME system resulted in statistically reduced colony forming units on MRS agar, suggesting that the metabolic profile of Donor 2 resident microbes did not support the growth and colonization of *L.p. plantarum*, as well as other microbes capable of growing on MRS agar.

Conclusions: In conclusion, although probiotics are designed and optimized to effect a standard beneficial impact on a wide range of individuals and gut microbiomes, certain specific clusters that include high intensity athletes will benefit from precisely designed probiotics, given their highly modified gut microbiome that has evolved to support intense physical activity.

Keywords: Probiotics, Mucin adhesion, Gut microbiota, Donors

Development of a HILIC-FLD-MS/MS method for the characterization of galacto-oligosaccharides (GOS) generated by recombinant β -galactosidases

Lucia Cocorullo^{1,2}, Tilmant, Thomas¹, Maxime Gavage¹, Adrien Boes¹,
Patrice Filée¹, Moreno Galleni², Nathalie Gillard¹

¹ CER Groupe, 6900 Marloie & Aye, Belgium

² Center for Protein Engineering (CIP), University of Liège, 4000 Liège, Belgium

l.cocorullo@cergroupe.be

Introduction: Galacto-oligosaccharides (GOS) are well-established prebiotics able to selectively modulate gut microbiota composition and activity. They are mainly produced by transglycosylation (TG) of lactose catalysed by β -galactosidases, which generates complex mixtures differing in degree of polymerization (DP), type of glycosidic linkage and branch location. This structural heterogeneity, which strongly influences GOS biological activity, makes their detailed characterization analytically challenging.

Objectives: This work aimed to develop a mass spectrometry-based analytical platform for the characterization of GOS mixtures and to apply it to GOS synthesized using recombinant β -galactosidases selected and produced in our laboratory.

Methods: GOS were synthesized via TG reactions catalysed by selected recombinant β -galactosidases. A HILIC-FLD-MS/MS (hydrophilic interaction liquid chromatography–fluorescence detection–tandem mass spectrometry) method was set up and optimized for reducing oligosaccharides. Prior to analysis, GOS were derivatized by reductive amination with fluorescent tags to prevent α/β anomer separation and subsequently purified. Retention times were converted into Glucose Units (GU) and matched against an open-access GU database for compound identification. Structural assignments were further supported by MS/MS fragmentation data.

Results: The developed method enabled effective separation of GOS according to DP and, to some extent, glycosidic linkage type. Fluorescence detection improved sensitivity, allowing detection of low-abundance species and relative quantification within complex mixtures. The combined use of GU values and tandem MS spectra provided reliable annotation of several GOS components. Nevertheless, limited availability of authentic standards and scarce representation of GOS in existing GU databases remain critical limitations.

Conclusions: The proposed HILIC-FLD-MS/MS platform represents a robust approach for the structural characterization of enzymatically produced GOS. To further improve annotation confidence, an internal database integrating GU values and MS/MS fragmentation data is being developed and progressively expanded, supporting future studies on structure–function relationships of prebiotic GOS.

Keywords: Galacto-oligosaccharides, enzymatic synthesis, MS-based structural characterization

Industry Session #1

Innovative probiotic solutions for food supplements François Heroufousse (Superbiotics)

Superbiotics presents its work on probiotics targeting immunity, as well as technological advances that protect strains when used as food supplements.



From the Microbiota to GLP-1: The Surprising Effect of Inulin on Our Metabolism Raphaël Bloquet (Cosucra)

Cosucra presents the role of inulin (a prebiotic fiber derived from chicory) and the gut microbiota in modulating GLP-1 secretion. The presentation explores the mechanisms, scientific evidence (both animal and human), and nutritional applications for GLP-1 users (through COSUCRA ingredients), particularly via protein- and fiber-enriched products (shakes, meals), as well as future research perspectives.

Bioactive Peptides

PEPTIBOOST: Development of a comprehensive and versatile platform for the generation of protein hydrolysates containing bioactive peptides to boost the functional food sector

PEPTIBOOST Consortium: Ana I. Fernandez Salina¹, Mélanie Grégoire^{2,3}, Claire Cauwelier^{1,4}, Bryan Renard^{5,6}, Evan Seyssens⁷, Cyril Michel⁸, Joanna Colot¹⁰, Marylène Vandevenne⁸, Johann Far⁷, Audrey Neyrinck⁴, Soukaina Hilali⁹, Kevin Léonard⁹, Maxime Gavage¹, Cindy Starck¹, David Torres¹, Tania Duré¹, Alain Brans⁸, Kheiro-Mouna Derfoufi¹¹, Mahmoud Hamzaoui⁹, André Matagne⁸, Frank Delvigne², Nathalie Delzenne⁴, Vincent Raussens¹¹, Thierry Arnould¹⁰, Catherine Michaux⁵, Francesco Renzi³, Jean-Yves Parfait⁶, Gauthier Eppe⁷, Patrice Filée¹, Nathalie Guillard¹

¹CER Groupe, ²ULiège-MiPi, ³UNamur-URBM, ⁴UCLouvain-MNut, ⁵UNamur-UCPTS, ⁶Multitel, ⁷ULiège-MsLab, ⁸ULiège-CIP, ⁹Celabor, ¹⁰UNamur-URBC, ¹¹ULB-SFMB

a.fernandezsalina@cergroupe.be

Introduction: The PEPTIBOOST project focuses on valorising diverse protein sources, including alternative proteins and industry byproducts, by integrating them into the functional ingredient value chain. This is achieved through the production of bioactive peptides formulated as protein hydrolysates for human and animal nutrition. Although food-derived bioactive peptides have long been recognized for their health-promoting properties, significant challenges remain, including the optimization of production conditions and the limited scientific evidence supporting specific health claims.

Objectives: The project aims to develop a comprehensive and standardized platform for the generation, characterization, and biological evaluation of protein hydrolysates. A key objective is to identify and validate bioactive peptides with demonstrated health benefits.

Methods: PEPTIBOOST establishes an integrated workflow encompassing protein source selection, enzymatic hydrolysis, fractionation, and bioactivity assessment using relevant in vitro and in vivo models. Advanced analytical approaches are applied to identify promising bioactive peptide sequences within complex hydrolysates. The platform is validated by targeting two highly prevalent diseases: intestinal inflammation and obesity. The implementation of such a comprehensive platform is possible thanks to the coordinated collaboration of eleven partners across nine institutions, combining complementary expertise in molecular biology, food science, biochemistry, nutrition, and health research.

Results: The project delivers a structured and transposable framework enabling the production and screening of protein hydrolysates, as well as the identification of candidate bioactive peptides with potential efficacy against intestinal inflammation and obesity.

Conclusions: PeptiBoost provides a multidisciplinary and translational platform that enhances the valorization of different protein sources. By addressing scientific and technological bottlenecks, the project contributes to innovation in both human and animal nutrition and establishes a framework for sustainable use of alternative protein sources.

Keywords: alternative proteins, bioactive peptides, protein hydrolysates

Bioactive Peptides

Multi-dimensional analytical approach for the identification of bioactive peptides

Evan Seyssens¹, Ana Fernandez Salina², Kévin Léonard³, Johann Far¹, Nathalie Gillard², Gauthier Eppe¹

¹ Mass Spectrometry Laboratory, University of Liège, Belgium

² CER Groupe, Belgium

³ Celabor SRL, Belgium

e.seyssens@uliege.be

In recent years, food-derived protein hydrolysates have been shown great interest because of some peptides released from unspecific enzymatic digestion have been found to exhibit biological activities such as antioxidative, anti-inflammatory, and antihypertensive.

Non-specific digestion, notably when non using any intrants such as reduction and alkylating reagents, substantially increases the variety of peptide sequences that can be produced from a protein sources. The complexity of the hydrolysate also increases the difficulty of characterizing the sequences of these peptides, especially for those displaying bioactivity due to the lack of standardized methods and bioinformatic workflow.

To alleviate this drawback, we propose to introduce an original multidimensional method that combines preparative Centrifugal Partition Chromatography (CPC) to fractionate the hydrolysate coupled with Capillary Zone Electrophoresis (CZE) hyphenated online with mass spectrometry (MS). The method offers a green chemistry compliant analytical technique for the characterization of the peptides present in the CPC fractions, while an ELISA based assay allows the screening of the bioactive CPC fractions against a specific target: the Toll-like receptor 4 (TLR-4), a key activator of innate immune response against bacterial infections. Database search, and sequence alignments of the peptides identified by CZE-MS is implemented to guide bioactive peptide discovery.

Keywords: Bioactive Peptides, Mass spectrometry

Bioactive Peptides

Purple phototrophic bacteria as a sustainable protein source: bioaccessibility and functional responses during in vitro digestion

Malou Nuyts^{1,2}, Mai Luyten^{1,2}, Sara Olyslaegers², Naïm Blansaer², Luis Diaz Allegue², Charlotte Grootaert¹, Siegfried E. Vlaeminck², John Van Camp¹

¹ Laboratory of Food Chemistry and Human Nutrition, Department of Food Technology, Safety and Health, Faculty of Bioscience Engineering, Ghent University, Belgium

² Biobased Sustainability Engineering (SUSTAIN), Department of Bioscience Engineering, University of Antwerp, Belgium

malou.nuyts@ugent.be

Introduction: The global food system faces increasing environmental pressure, while growing recognition of the importance of diet-related gut health is reshaping nutritional priorities. Purple phototrophic bacteria (PPB) represent a promising microbial resource, enabling carbon-efficient production of protein-rich biomass with potential health benefits.

Objectives: As the bioaccessibility of PPB-derived proteins and bioactive compounds remains poorly understood, this study aimed to evaluate the effect of pretreatment on their release and activity, assess their behavior during simulated digestion, and explore the effects of digested PPB fractions on intestinal cell growth.

Methods: Freeze-dried *Rhodobacter capsulatus* was subjected to high-pressure homogenization (HPH), sonication, or solvent extraction, after which antioxidant-, carotenoid-, and protein-associated characteristics were spectrophotometrically assessed. HPH-treated and untreated samples underwent in vitro digestion, followed by protein profiling and spectrophotometric analysis. Preliminary cytotoxicity and growth effects were evaluated using undifferentiated Caco-2 cells.

Results: HPH was the most effective pretreatment, consistently yielding the highest assay signals, potentially through liberation of pigment-protein assemblies exceeding 100 kDa. In vitro digestion revealed progressive protein hydrolysis and enhanced intestinal-phase carotenoid availability, both more pronounced after HPH pretreatment. Caco-2 assays demonstrated concentration-dependent biological responses, with reduced cellular protein content and growth at higher biomass concentrations and growth-enhancing effects upon dilution, appearing at higher concentrations of untreated PPB and only after further dilution of HPH-treated biomass.

Conclusions: PPB biomass may act as a natural encapsulation for bioactive compounds, enabling intestinal-phase delivery, while modulation of HPH intensity offers opportunities to tailor gastrointestinal release profiles towards specific functional objectives. As one of the first studies to explore PPB bioaccessibility and cellular effects, these findings provide a foundation for further exploration of PPB as sustainable, health-promoting food ingredients.

Industry Session #2

The nutritional impact of sprouting on bioaccessible minerals and future perspectives

Claire Van Der Aa (Puratos)

Our research on sprouted grains demonstrates that processing is not inherently detrimental to nutritional quality. On the contrary, when it is purposefully designed, processing can significantly improve the bioaccessibility of key nutrients, such as minerals and proteins, by reducing antinutritional factors and enhancing matrix breakdown.



Building on these findings, we aim to extend this research to other processes and food matrices, including sourdough fermentation, to better understand how different bioprocessing strategies influence nutrient release during digestion. By focusing on bioaccessibility rather than composition alone, we move closer to assessing the *true nutritional value* of foods as they are consumed.

In a context where food processing (and especially ultra-processing) is often viewed negatively by both consumers and policymakers, our research highlights a more nuanced reality: not all processing is the same. Certain biological and fermentation-based processes can be powerful tools to improve nutritional quality and functionality, aligning technological innovation with health-driven food design.

Industry Session #2



From Mechanistic Synergy to Clinical Translation: An Innovative Fructan–HMO Combination for Toddler Nutrition

Maria Pudenz (BENEO-Institute, BENEO GmbH, Germany)

Maria.pudenz@beneo.com

Co-contributors: Stephan Theis¹, Lea Bircher², Christophe Lacroix²

¹ BENEO-Institute, BENEO GmbH, Wormser Str. 11, 67283 Obrigheim, Germany.

² ETH Zurich, Institute of Food, Nutrition and Health, Laboratory of Food Biotechnology, Schmelzbergstrasse 7, CH-8092 Zürich, Switzerland

Introduction: BENEO develops functional ingredients with expertise in prebiotics used in infant and follow-up formula. While inulin-type fructans provide broad fermentability and consistent bifidogenic effects, human milk oligosaccharides (HMOs) such as 2'-fucosyllactose (2'-FL) enable more structure-specific microbial interactions. Combining these substrates was hypothesized to create complementary fermentation patterns and enhanced functional outputs compared to single-ingredient approaches.

Objective: To develop and translate a targeted fructan–HMO combination that integrates broad substrate availability with selective microbial stimulation, aiming to generate synergistic microbiota modulation as a mechanistic basis for immune-related effects in toddlers.

Methods: A continuous PolyFermS® in vitro fermentation model inoculated with stool samples from two toddlers was used to compare fructans alone, 2'-FL alone, and their combination. Microbial composition was analyzed by 16S rRNA and bifidobacterial ITS sequencing. Short-chain fatty acids were quantified using HPLC.

Results: Fructans induced marked metabolic and compositional changes, whereas 2'-FL alone showed moderate effects. The combination resulted in distinct microbial patterns not observed with individual substrates, indicating additive or synergistic interactions. The combination enhanced butyrate production and increased *Faecalibacterium* and *Lachnospiraceae*, suggesting cross-feeding mechanisms. Bifidogenic responses were strengthened compared to single ingredients, although donor-dependent.

Conclusions: The fructan–HMO combination represents a mechanism-driven innovation in toddler nutrition by deliberately combining complementary modes of action. The in vitro findings provided the rationale for an ongoing randomized clinical trial in toddlers investigating microbiota effects and immune-related outcomes.

As a Belgian company, BENEO is advancing this work within a close regional network that connects ingredient development, manufacturing, and academic clinical research

Keywords: Prebiotics, Inulin, HMO, 2'-Fucosyllactose, Infant formula, Synergy

Emerging Approaches

Using Life Cycle Assessment to guide the development of sustainable protein ingredients: the PROTEBoost case study

Olivier Talon¹, Guillaume Bayon-Vicente², Mathieu De Rijdt³, Valérie Dormal⁴, Baptiste Leroy²

¹ Materia Nova, Belgium

² Laboratory of Proteomics and Microbiology, University of Mons, Belgium

³ Smart Gastronomy Lab, Gembloux AgroBioTech, University of Liège, Belgium

⁴ Center of Investigation in Clinical Nutrition, UCLouvain, Belgium

olivier.talon@materianova.be

Developing novel protein ingredients requires not only demonstrating their nutritional adequacy but also ensuring their environmental sustainability. Life Cycle Assessment (LCA) is a valuable tool to evaluate and optimize the environmental performance of emerging food technologies from early development stages.

This work illustrates how LCA can be integrated into a food innovation project to guide eco-design decisions and benchmark novel products against market alternatives. The case study focuses on the PROTEBoost project, which develops protein-rich foods based on purple bacteria biomass cultivated on agrifood co-products.

LCA was applied to assess the entire production chain: biomass cultivation in photobioreactors using molasses, downstream processing, and integration into food formulations. Environmental impacts were calculated and contribution analysis identified process hotspots. Multiple nutritional LCA approaches were compared to position bacterial biomass-based products versus meat and plant-based alternatives.

LCA revealed that lighting energy for photobioreactors dominates the environmental footprint, providing clear direction for process optimization efforts. Comparative analysis shows that purple bacteria-based products can achieve environmental competitiveness with both meat and plant alternatives, though conclusions may vary depending on the nutritional comparison methodology chosen.

This case study demonstrates how LCA, when applied early in food innovation projects, provides actionable insights for sustainable development and robust environmental positioning of novel protein ingredients in an evolving nutritional landscape.

Keywords: Life Cycle Assessment, sustainable proteins, purple bacteria, eco-design, nutritional LCA, food innovation

Emerging Approaches

Protein Digestion After Metabolic and Bariatric Surgery in Older Adults: A Controlled Feeding Study Using a Dual-Isotope Tracer Technique

Gabriël Eksteen¹, Bart Van der Schueren^{1,2}, Kristin Verbeke³, Roman Vangoitsenhoven^{1,2}, Ann Mertens^{1,2}, Matthias Lannoo^{1,4}, Ellen Deleus^{1,4}, Tim Vanuytsel^{3,5}, Christophe Matthys^{1,2}

¹ Clinical and Experimental Endocrinology, KU Leuven, Belgium

² Department of Endocrinology, University Hospitals Leuven, Belgium

³ Translational Research in Gastrointestinal Disorders, KU Leuven, Belgium

⁴ Department of Abdominal Surgery, University Hospitals Leuven, Belgium

⁵ Department of Gastroenterology and Hepatology, University Hospitals Leuven, Belgium

gabrieljohannes.eksteen@kuleuven.be

Introduction: Adequate protein intake is essential after metabolic bariatric surgery (MBS) to support the preservation of muscle mass and reduce the risk of sarcopenia. While protein intake is often reduced after surgery, the impact of altered gastrointestinal anatomy on protein digestion, particularly in older adults, remains unclear. We aimed to assess dietary protein digestion in adults aged ≥ 65 years who had previously undergone MBS or had no history of MBS.

Methods: This was non-randomized, controlled, single-exposure metabolic study, wherein participants consumed a standardized liquid protein meal enriched with intrinsically labelled ^{15}N -spirulina protein and crystalline ^{13}C -phenylalanine. Protein digestibility was quantified using the dual-isotope tracer technique (DITT) by comparing plasma appearance of labelled amino acids. Secondary analyses explored associations between digestibility, protein intake, and skeletal muscle mass. Participants included 12 participants with previous RYGB and 12 non-surgical controls.

Results: Plasma ^{15}N -phenylalanine kinetics were similar between groups. Peak plasma ^{13}C -phenylalanine occurred earlier and was higher in RYGB participants (6.75 ± 1.68 vs. 3.69 ± 1.26 $\mu\text{mol/mL}$, $p < 0.001$), while total area under the curve did not differ. Spirulina digestibility was numerically lower in RYGB participants compared with controls ($70 \pm 13\%$ vs. $77 \pm 16\%$, $p = 0.20$) but did not reach statistical significance. Digestibility was highly variable but not associated with age, sex, protein intake, or skeletal muscle mass.

Conclusions: In older adults, protein digestibility after RYGB appears largely preserved and is comparable to non-surgical controls. Although individual variability exists, maldigestion was mild to negligible. Future studies should assess whether proteins from foods requiring greater mechanical or chemical digestion behave similarly. These findings suggest that routine increases in protein intake specifically to compensate for impaired digestion after RYGB are not necessary, although adequate protein consumption remains important to support muscle mass in older adults.

Keywords: proteolysis, digestion, bariatric surgery, obesity, isotope labeling

ABSTRACTS – POSTERS

Poster #1: Developing a Method for Biomarker Identification in Longitudinal Studies: Integrating SIFT-MS Full-Scan and Targeted Analyses

Axel Mercier

Multitel, Belgium

mercier@multitel.be

In projects such as Foodwal, our aim is to investigate the impact of specific conditions on the gut microbiota. Two approaches can be employed to achieve this: stool analysis, which is invasive, and volatolome analysis, which is preferable for examining short-term variations in the gut microbiota, such as those occurring over a single day. Volatolome analysis using Selected Ion Flow Tube Mass Spectrometry (SIFT-MS) offers two types of analysis: targeted and full-scan. Targeted analysis requires prior knowledge of the components to be analyzed.

Our goal is to develop a method that utilizes full-scan data from individuals at each measurement point during longitudinal studies. We construct clusters through dimensionality reduction using the Uniform Manifold Approximation and Projection for Dimension Reduction (UMAP) algorithm. At each time point, we identify volatile compounds for which all associated ion-mass signals are significantly different ($p < 0.05$) between the two groups (with vs. without condition). For these compounds, we then verify whether their concentrations—measured via targeted analysis using all relevant signals—are also significantly different ($p < 0.05$) between the same groups. This two-step validation ensures that only compounds consistently detected as differential by both full-scan and targeted analyses are retained as potential biomarkers. This process yields a list of elements that can be verified and refined by biologists, providing a robust framework for identifying potential biomarkers in gut microbiota research.

Keywords: SIFT-MS, Biomarker, Volatolome, Statistics, Longitudinal Studies

Poster #2: Developing Innovative, Nutrient Rich Functional Foods from Local Aronia

Pauline Debisschop, Caroline Nain, Jonas Spinewine, Emeline Dierge
Louvain Institute of Biomolecular Science and Technology, Cetrail, UCLouvain, Belgium

emeline.dierge@uclouvain.be

Introduction: Cardiovascular diseases (CVD) remain the leading cause of mortality worldwide. Improving dietary patterns represents a major opportunity to reduce CVD risk. Aronia melanocarpa, exceptionally rich in anthocyanins, especially cyanidin 3 O galactoside (C3Gal), shows documented cardioprotective effects, including reductions in LDL and total cholesterol. Despite this potential, aronia remains underused in innovative food applications.

Objectives: This research aimed to develop a range of aronia based functional foods using locally grown aronia. Alongside a dip and cracker duo, we also developed an aronia fruit jam to broaden consumer acceptance. The objectives were to ensure the stability of bioactive compounds, assess sensory acceptability, and evaluate the nutritional potential of each product.

Methods: Three complementary formulations were developed: a red bean and beetroot dip enriched with aronia, sourdough crackers incorporating aronia powder, and a fruit jam in which aronia was combined with raspberry to balance acidity and enhance palatability. Processing conditions were optimized to preserve anthocyanins and total phenolic compounds. Nutritional analyses were carried out, alongside a consumer sensory test assessing color, aroma, texture and overall liking.

Results: Aronia bioactive compounds were successfully preserved across all matrices. In the dip, C3Gal content remained stable after pasteurization, resulting in a 55 mg dose per 50 g serving, above the threshold associated with daily cardioprotective effects. Microbiological analyses demonstrated product safety for at least 10 days after opening. The jam showed excellent pigment retention and a favorable nutritional profile with naturally high phenolic compounds content, a reduced sugar level and no added preservatives. Sensory testing revealed consumer appreciation for the dip's and jam's balanced acidity, intense color, and fruity aroma, supporting its potential as a more accessible entry product to introduce aronia to the market.

Conclusions: The development of three aronia based products demonstrates the technological feasibility and nutritional relevance of integrating A. melanocarpa into foods. By preserving its anthocyanins and ensuring sensory acceptability, these products offer promising, enjoyable solutions to improve the nutritional environment and support CVD prevention. The versatility of aronia further highlights its relevance for sustainable, locally anchored value chains.

Keywords: Nutrition, Aronia, Anthocyanines, Functional Food

Poster #3: Valorisation of by-products in human nutrition: the example of rapeseed meal

Jonas Spinewine, Pauline Debisschop, Emeline Dierge

Louvain Institute of Biomolecular Science and Technology, Cetrail, UCLouvain, Belgium

jonas.spinewine@uclouvain.be

Introduction: Industrial food production, dominated by ultra-processed products, drives the rise of non-communicable diseases, creating an urgent need for innovative, nutritionally meaningful solutions. This research focuses on maximizing the valorization of all agricultural and food resources to enable smarter, circular use without increasing consumption. It targets Belgian co-products such as apple peels, walnut and rapeseed press cakes, brewers spent grains, and grape marc, aiming to support diets that are both nutritionally dense and environmentally sustainable.

Objectives: This work aims to nutritionally characterize selected Belgian agri-food co-products, evaluate their conservation and safety, develop prototype food formulations, and assess the economic feasibility and consumer acceptability of integrating these co-products into sustainable, innovative foods.

Methods: Selected co-products underwent extensive nutritional profiling, including macronutrients, micronutrients, bioactive and functional compounds, as well as antinutritional factors. Water activity, oxidation status, and microbiological analyses were performed to evaluate stability and sanitary quality. Prototype formulations were developed through iterative testing, and sensory evaluation panels were conducted to assess organoleptic properties and consumer acceptance of the resulting products.

Results: Our results demonstrate that co-products can be successfully integrated into human diets. They exhibit high nutritional potential, no health risk, and economic viability. Several prototypes were developed, including walnut press-cake crackers, brewers' spent grain bread, rapeseed press-cake vinaigrette-style sauce, wheat bran breadcrumbs, and apple peel biscuits. These products combined nutritional richness, satisfactory sensory properties, and positive consumer acceptance, confirming the technical, sanitary, and economic feasibility of co-product valorization for sustainable food innovation.

Conclusions: This work highlights the potential of agri-food co-products as valuable ingredients for circular, nutrition-focused food systems. By integrating these resources into food products, it is possible to reduce waste, improve dietary quality, and support environmentally responsible food production, providing a scalable model for sustainable innovation in the Belgian agri-food sector.

Keywords: co-products, valorization, agri-food, sustainable innovation

Poster #4: Nutritional characterization, storage stability and valorization of walnut press cake

Pauline Debisschop, Jonas Spinewine, Emeline Dierge

Louvain Institute of Biomolecular Science and Technology, Cetrail, UCLouvain, Belgium

pauline.debisschop@uclouvain.be

Introduction: The valorization of agri-food by-products is a key strategy for more sustainable food systems. Walnut press cake (WPC), a by-product of oil extraction, is rich in proteins, fibers, and polyunsaturated fatty acids. However, limited data on its composition and storage stability restrict its use in human food.

Objectives: This study aimed to characterize the nutritional composition of WPC obtained from *Juglans regia* L. (variety Franquette) by hot pressing, and to evaluate its physicochemical and microbiological stability under various storage conditions. It also aimed to develop a prototype cracker as a proof of concept for the nutritional valorization of WPC in human food.

Methods: Proximate composition was determined by standard analytical methods (Dumas for proteins, Soxhlet extraction for lipids, AOAC 994.12 for amino acids, and Folch method for fatty acids). The fatty acid methyl esters (FAME) profile was analyzed by GC-FID. Storage stability was assessed over nine months under four conditions combining two temperatures (4°C, 20°C) and two packaging modes (vacuum, resealable plastic bags). Peroxide value (PV), p-anisidine value (p-AV), water activity (Aw), and microbial counts were monitored.

Results: WPC showed a high nutritional density, with 38.3 g/100 g proteins, 29.5 g/100 g lipids (mainly polyunsaturated fatty acids, 20.3 g/100 g), and 7.5 g/100 g fibers. The ω -6/ ω -3 ratio was balanced (4.4), and all essential amino acids were present, although tryptophan was limiting. During storage, Aw remained below 0.6, preventing microbial growth. PV increased significantly after seven months, indicating lipid oxidation, while p-AV remained low. After nine months, only samples stored under vacuum at 4 °C maintained PV < 10 meq O₂/kg, highlighting this condition as the most effective to limit oxidative degradation.

WPC was successfully incorporated into a cracker formulation as a partial flour substitute, yielding a Nutri-Score A product high in fiber, source of protein and rich in polyunsaturated fatty acids.

Conclusions: WPC presents a high nutritional potential for human consumption as a protein- and fiber-rich ingredient. However, its susceptibility to oxidation requires controlled storage. Vacuum packaging combined with refrigeration (4 °C) effectively preserves its quality for up to nine months. These findings provide essential knowledge to support the food-grade valorization of walnut by-products within sustainable processing chains.

Keywords: walnut press cake ; by-product ; nutrition ; valorization

Poster #5: Oxidative stability of walnut oil supplemented with rosemary extract under real storage and domestic use conditions

Pauline Debisschop, Jonas Spinewine, Emeline Dierge

Louvain Institute of Biomolecular Science and Technology, Cetrail, UCLouvain, Belgium

pauline.debisschop@uclouvain.be

Introduction: Walnut oil (WO) is characterized by a particularly high content of polyunsaturated fatty acids (PUFAs), notably linoleic acid and α -linolenic acid, with an ω -6/ ω -3 ratio of ~4:1, considered ideal for human health. However, its high PUFA content makes WO highly susceptible to lipid peroxidation, compromising sensory and nutritional quality. Controlling oxidative degradation is therefore essential for its preservation during storage and use.

Objectives: This study aimed to identify effective stabilization strategies for WO by determining the optimal concentration of a natural antioxidant extract and the maximum shelf life under real storage conditions.

Methods: WO obtained by hot pressing of Franquette kernels was supplemented with organic rosemary extract (RE; 0, 150, 300, 500 ppm) and stored in sealed bottles at room temperature for up to 24 months. Oxidative status was monitored by peroxide (PV) and p-anisidine (p-AV) values. To simulate domestic use, bottles from different storage duration were opened, refrigerated (4°C) and subjected to biweekly opening and agitation, with post-opening stability assessed after 1, 3, and 6 months.

Results: Oxidative stability in sealed bottles depended on antioxidant concentration and storage duration. PV increased over time but rose more slowly as RE concentration increased. WO without RE exceeded the acceptability threshold (PV = 10 meq O₂/kg) after nine months at room temperature, whereas RE-enriched oils remained below this limit. Differences between RE levels became apparent after nine months, with significantly lower PV at 500 ppm than at 150 ppm. p-AV remained low and unaffected by RE concentration. After bottle opening, differences between oils became more pronounced. Oils refrigerated and repeatedly opened showed slower accumulation of primary oxidation products than oils stored continuously at room temperature in sealed bottles, indicating a stronger effect of temperature than intermittent oxygen exposure. p-AV remained low.

Conclusions: RE effectively delays primary oxidation in WO, with higher concentrations providing greater protection during storage. Storage temperature is a key determinant of oxidative stability, with refrigeration markedly limiting peroxide formation even after opening. These results represent intermediate findings of an ongoing two-year stability study. They support combined antioxidant supplementation and temperature control to extend WO shelf life under real use conditions.

Keywords: Walnut oil ; oxidation

Poster #6: Valorization of Bovine Colostrum for the Production of HMO-Like Prebiotic Oligosaccharides

M. Kammoun, T. Tilmant, A. George, A. Lamarche, A. Boes, P. Filée, and N. Gillard
CER Groupe, 6900 Marloie & Aye, Belgium

m.kammoun@cergroupe.be

Bovine colostrum, a dairy resource that remains insufficiently valorized in high-value applications, is a rich source of glycoproteins carrying complex N-glycans that share structural features with Human Milk Oligosaccharides (HMOs). As such, it represents a promising and sustainable raw material for the production of HMO-like prebiotic oligosaccharides capable of modulating beneficial gut microbiota, supporting immune maturation, and protecting against pathogens.

The N-glycBooster project aims to develop novel libraries of oligosaccharides enzymatically derived from bovine colostrum glycoproteins using both mono-enzymatic and combined enzymatic strategies, followed by structural characterization of the resulting oligosaccharides.

Enzymatic activities were initially validated using Sialylglycopeptide (SGP) as a model substrate. Recombinant glycosidases targeting specific monosaccharide residues were produced and applied either individually or sequentially in combination. Various enzyme concentrations were evaluated to assess dose-dependent activity and reaction efficiency. The generated oligosaccharides were analyzed and structurally characterized by High-Resolution Mass Spectrometry (HRMS).

Within the combined enzymatic strategy, three enzymes were successfully coupled, enabling controlled stepwise trimming of the N-glycan structure. An intermediate product obtained corresponded to the trimannose core (Man₃), confirming efficient removal of peripheral residues and functional compatibility among the enzymes.

Overall, this study demonstrates the feasibility of valorizing bovine colostrum as a sustainable source for the production of HMO-like oligosaccharides through controlled enzymatic bioconversion. The successful generation of an intermediate trimannose core validates the enzymatic approach and establishes a foundation for the development of tailored prebiotic glycan libraries with potential applications in functional foods and infant nutrition.

Keywords: Bovine colostrum, N-glycans, Enzymatic bioconversion

Poster #7: A Breakthrough in Allergy Management: Could the Synbioceutical® Concept Be a Game Changer?

Olivier RAIMOND¹, Najlae EL KERTAOU¹, Melodie SCHMITZ²

¹ BellaVie, Rue Sainte-Eugenie, 42 - Tamines, Belgium

² CER Groupe, Rue de la Science, 8 - Marloie, Belgium

olivier@bellavie.eu

Introduction: Allergies are increasingly prevalent in developed countries, yet existing treatments primarily manage symptoms. Skinosal, a novel synbiotic formulation aims to prevent cutaneous and respiratory allergies. This study evaluated Skinosal's effects on allergic responses in a murine model of ragweed pollen allergy.

Material & Method: Balb/c mice were sensitized to ragweed pollen over three weeks and divided into four groups: control (PBS), low and high-dose Skinosal, and negative control. After sensitization, mice were challenged with ragweed pollen, and allergic reactions were assessed through clinical scoring, IgE, and cytokine profiling. Data were analyzed using ANOVA and non-parametric tests.

Results: Results showed that control groups had significant allergic symptoms after the challenge. The high-dose Skinosal group had a delayed onset and reduced severity of symptoms compared to the PBS control group. Although IgE levels increased in all challenged groups, the high-dose Skinosal group tended to have lower IgE levels, indicating a potential mitigating effect. Cytokine analysis revealed significant upregulation of IL-5 and TNF- α , and downregulation of IL-1 β in males in the positive control group. Skinosal-treated groups showed a trend towards modulating these cytokine responses.

Conclusion: Skinosal show promise for allergy prevention by delaying reactions, reducing symptom severity, and modulating immune responses. Further studies are needed to confirm efficacy.

Keywords: Synbiotic, Probiotic, Allergies, Immune modulation, IgE, Cytokines

Poster #8: From grape pomace to prebiotics: Structural characterization of pectic oligosaccharides using a UHPLC-FLR-cIMS-HRMS workflow

Thomas Tilmant¹, Lucia Cocorullo¹, Job Tchoumtchoua², Maxime Gavage¹, Nathalie Gillard¹

¹ CER Groupe, Marche-en-Famenne, Belgium

² Celabor SRL, Herve, Belgium

t.tilmant@cergroupe.be

Introduction: Pectic oligosaccharides (POS) are emerging prebiotics of growing interest due to their ability to modulate the gut microbiota. In this study, POS were produced from grape pomace, a major by-product of the agri-food industry, with the objective of generating higher value-added functional ingredients. However, POS exhibit high structural complexity, including variable degrees of polymerization, branching patterns, and extensive isomerism, making their characterization analytically challenging. Here, we present a strategy based on UHPLC-FLR coupled with cyclic ion mobility high-resolution mass spectrometry (UHPLC-FLR-cIMS-HRMS) to characterize POS production.

Objectives :

- Characterize POS generated from grape pomace.
- Perform relative quantification of individual oligosaccharides.
- Exploit the enhanced separation capabilities of cyclic ion mobility to improve structural characterization of POS.

Methods: POS samples were derivatized using procainamide and analyzed by UHPLC-FLR-cIMS-HRMS. Different hydrolysis conditions were compared to optimize POS production from grape pomace. An in-house POS database was developed integrating dextran ladder normalized glucose units (GU) value, collision cross section (CCS), MS and MS/MS data.

Results: Derivatization and purification steps were optimized to ensure high sensitivity and reproducibility for complex POS mixtures. The UHPLC-FLR-cIMS-HRMS workflow enabled the comparison of hydrolysis conditions and demonstrated significant differences in POS structural profiles, highlighting the importance of production parameters on the final prebiotic composition. This approach resolved POS isomers by ion mobility, provided confident structural annotation via GU-CCS-MS/MS matching, and enabled fluorescence-based relative quantification. The POS database facilitates identification and monitoring of individual species during POS production. The advanced separation capabilities of cyclic IMS will be further exploited to refine structural elucidation and strengthen database annotation, particularly for POS isomers preferentially utilized by probiotics.

Conclusions: Our UHPLC-FLR-cIMS-HRMS workflow enables high-resolution separation and characterization of structurally complex POS mixtures. This integrated MS-driven analytical platform provides a powerful approach for the structural profiling of POS and supports the valorization of grape pomace into structurally defined prebiotic ingredients.

Keywords: Grape Pomace; Pectic oligosaccharides; Prebiotics; Cyclic Ion Mobility, High Resolution Mass Spectrometry

Poster #9: Assessment of the Allergenicity of Alternative Proteins

M. Gavage, L. Poncelet, A. Henry, D.Torres, G. Thirion, P. Filée and N. Gillard
CER Groupe, 6900 Marloie & Aye, Belgium

m.gavage@cergroupe.be

Introduction: The growing demand for sustainable protein sources is driving the development of plant-based and alternative proteins from crops, co-products, microalgae, and insects. However, shifts in diet and the introduction of novel proteins may increase the risk of emerging food allergens, requiring robust assessment tools to ensure consumer safety. The Wal'Prot project supports regional protein autonomy by developing innovative valorisation strategies while evaluating the allergenic potential of these new sources.

Objectives: This work aimed to assess the allergenic potential of alternative proteins using an in-vitro digestion model to evaluate protein stability, and an in-vivo mouse model combined with ex-vivo immunological analyses to characterize sensitization and allergic responses.

Methods: An in-vitro gastrointestinal digestion model (INFOGEST, with partner UCLouvain) was used to assess protein digestibility and identify resistant peptides by high-resolution mass spectrometry. In parallel, an in-vivo BALB/c mouse model was used to evaluate sensitization and clinical allergic responses. Ex-vivo analyses centered on allergen-specific immunoglobulins and cytokine profiles as primary readouts, complemented by immune cell phenotyping to characterize Th-driven responses.

Results: The in-vitro digestion model generated peptide fragments of varying sizes, including resistant fragments that may be associated with increased allergenic potential. These data contribute to a broader predictive framework currently being developed by the partner ULB. In parallel, the in-vivo and ex-vivo components of the workflow were successfully established using a well-controlled peanut allergy model in BALB/c mice. This validated reference system enabled reliable characterization of clinical reactions, allergen-specific immunoglobulins, cytokine patterns, and immune cell profiles. Establishing and mastering this peanut-based model was an essential first step before applying the full allergenicity assessment workflow to the protein sources studied within Wal'Prot.

Conclusions: This multidimensional approach provides a robust framework for assessing the allergenic potential of emerging protein sources. The Wal'Prot project supports the safe development of sustainable protein value chains by generating evidence to guide innovation and consumer protection.

Keywords: Allergenicity assessment, Alternative proteins

Poster #10: Development of an In Vivo Mouse Model to Assess the Potential Allergenicity of Alternative Proteins

Lucie Poncelet, Aurélie Henry, Maxime Gavage, Cindy Staerck, David Torres, Gaëtan Thirion, Nathalie Gillard, Patrice Filée

CER Groupe, 6900 Marloie & Aye, Belgium

l.poncelet@cergroupe.be

Introduction: Rising food demand and dietary changes challenge the identification of sustainable protein sources. Alternative proteins from plants, microalgae, insects, or co-products are of growing interest, but may trigger new food allergies. The Wal'Prot project supports regional protein autonomy while assessing the allergenic potential of these novel proteins.

Objectives: The Wal'Prot project aims to develop a workflow ranging from the production of protein mixes to the establishment of an in vivo mouse model combined with ex vivo immunological analyses. This approach aims to assess the allergenic potential of novel protein sources using key markers associated with allergic sensitization.

Methods: The production of the allergenic protein mix was first performed to generate the material used in the experimental workflow. The development of an in vivo BALB/c mouse model involves two phases: a sensitization phase, in which allergenic proteins are administered by repeated gavage, and an elicitation phase, in which the allergenic protein is delivered, mixed or not with a mucoid adjuvant, via intraperitoneal injection. During the elicitation phase, the clinical allergic responses were monitored and scored. In addition, biological samples, including whole blood and serum, were collected for ex vivo analyses, assessing allergen-specific responses, specific antibodies, cytokine profiles and functional immunophenotyping.

Results: The in vivo BALB/c mouse model, initially established using a mix of peanut proteins as the allergenic protein source, generated symptomatic clinical responses of food allergy during the elicitation phase following sensitization. Intraperitoneal injection of the allergenic protein mix induced a decrease in body temperature and allergic symptoms such as scratching, reduced mobility and piloerection. Ex vivo analyses confirmed the workflow, showing a progressive development of allergen-specific immunoglobulins. Cytokine profiles associated with the mix of peanut proteins indicated a Th2-oriented immune response.

Conclusions: This in vivo model represents a tool for allergenicity assessment and provides a first step toward the evaluation of alternative protein sources within the Wal'Prot project. The integrated workflow developed could contribute to the safe development of alternative food sources by helping to mitigate the risk of emerging food allergies.

Keywords: Alternative protein, Food-allergy, in vivo mouse model

Poster #11: Development and validation of an UHPLC–MS/MS method for the identification and quantification of fructooligosaccharides from Yacón root and culture supernatants

Niko Eichten¹, Thomas Tilmant¹, Pauline Fauquet², Céline Deryck³, Cindy Staerck¹, Maxime Gavage¹, Nathalie Gillard¹

¹ CER Groupe, Marche-en-Famenne, Belgium

² Celabor SRL, Herve, Belgium

³ Laboratoire de Sciences des Aliments et Formulation ULiege, Gembloux, Belgium

n.eichten@cergroupe.be

Introduction: Functional foods enriched with prebiotics and probiotics have gained increasing attention due to their beneficial effects on gut health. Fructooligosaccharides (FOS) are well-recognized prebiotic compounds that can be extracted from Yacón (*Smallanthus sonchifolius*) roots. Given their structural diversity and varying degrees of polymerization (DP), robust analytical methods are required to accurately characterize and quantify FOS in raw materials, processed products and biological matrices.

Objectives: This study aims to develop and validate a quantitative analytical method for the identification and quantification of FOS with degrees of polymerization ranging from DP1 to DP10 in Yacón-derived samples as well as in bacterial culture supernatants.

Methods: An ultra-high-performance liquid chromatography coupled to tandem mass spectrometry (UHPLC–MS/MS) method was developed and optimized for the separation, detection and quantification of FOS (DP1–10). The method was applied to various Yacón-based matrices, including raw root, powder, juice and syrup. Analytical parameters were optimized to enable accurate measurement of FOS in complex matrices such as bacterial culture supernatants. Method validation was performed to assess selectivity, sensitivity, linearity, precision and accuracy.

Results: The developed UHPLC–MS/MS method enables the reliable identification and quantification of FOS (DP1–10) in Yacón root-derived samples, including root, powder, juice and syrup. The method was successfully optimized for the analysis of FOS in culture supernatants which allows accurate monitoring of FOS profiles in complex biological matrices. Validation results demonstrate satisfactory analytical performance. Furthermore, the method was applied to monitor FOS consumption in *Lactobacillus* culture supernatants, enabling detailed assessment of their utilization dynamics.

Conclusions: A robust and validated UHPLC–MS/MS method was developed for the identification and quantification of fructooligosaccharides (DP1–10) in Yacón-derived samples and for monitoring their consumption in bacterial culture supernatants. This analytical approach provides a reliable tool for the characterization of FOS in functional food research and for studying their metabolic utilization by probiotic microorganisms.

Keywords: Fructooligosaccharides ; UHPLC–MS/MS method ; Quantification ; Prebiotics and Probiotics

Poster #12: Unlocking the Power of Green Lentil Proteins: A New Source of Bioactive Peptides

C. Michel¹, G. Durant³, A. Fernandez Salina², A. Brans¹, V. Raussens³, A. Matagne¹, M. Vandevenne¹

¹ Center for Protein Engineering (CIP), University of Liege, Liege, Belgium

² CER Groupe, Aye, Belgium

³ Structure and Function of Biological Membranes (SFMB), Université Libre de Bruxelles, Bruxelles, Belgium

c.michel@uliege.be

Introduction: The discovery of novel bioactive molecules represents an important strategy for improving human health. Bioactive peptides (BPs) are short protein fragments that are inactive within their parent proteins but can exert significant physiological effects once released. Among plant-based sources, green lentils (GL) are particularly attractive due to their high protein content and reported bioactive properties, including antioxidant activity and inhibition of angiotensin-converting enzyme (ACE).

Objectives: This project aims to produce bioactive peptides from green lentil proteins by developing and applying multiple enzymatic hydrolysis strategies capable of generating peptide fractions within the molecular size range commonly associated with enhanced bioactivity.

Methods: An efficient protocol for extracting proteins from green lentil flour was first established. The extracted proteins are then subjected to three complementary hydrolysis strategies. The first uses conventional industrial enzymes commonly applied in protein hydrolysis. The second relies on innovative enzymes identified and developed in-house, currently undergoing production and purification, which may enable novel cleavage patterns and generate unique peptide sequences. The third strategy employs protease-enriched supernatants, offering a flexible and cost-effective source of hydrolytic activity. In parallel, quality control and characterization techniques were developed to analyze the resulting peptides, including Fourier-transform infrared spectroscopy (FTIR) and circular dichroism (CD).

Results: These enzymatic approaches generate diverse peptide hydrolysates derived from green lentil proteins. Combining conventional and newly developed enzymes expands the range of cleavage patterns and increases peptide diversity within the targeted size window associated with bioactivity.

Conclusions: This work highlights a versatile and adaptable platform for producing bioactive peptides from green lentils. The poster will emphasize the hydrolysis strategies used, the rationale for combining conventional and innovative enzymatic tools, and the analytical approaches developed for peptide characterization.

Keywords: Bioactive peptides - Green lentils (*Lens culinaris*) - Enzymatic hydrolysis - Proteases - Plant proteins - Peptide characterization

Poster #13: In vivo and in vitro protein and amino acid digestibility of plant-based foods and ingredients

Beatriz Miralles¹, Gómez-Marín¹, Natalia S. Fanelli², Hans H. Stein³, Isidra Recio¹

¹ Institute of Food Science Research, CIAL (CSIC-UAM, CEI UAM+CSIC), C. Nicolás Cabrera, 9, 28049 Madrid, Spain

² Department of Animal Sciences, University of Illinois Urbana-Champaign, Urbana, IL, USA

³ Department of Animal Sciences and Division of Nutritional Sciences, University of Illinois Urbana-Champaign, Urbana, IL, USA

beatriz.miralles@csic.es

Protein nutritional quality refers to the ability of dietary proteins to fulfil the digestible amino acid requirements of the human body. Five research protocols are currently recommended to determine the digestible amino acid score DIAAS, all of which require human or animal studies and involve methodologies with varying levels of invasiveness. Thus, there is a need to develop rapid and reproducible in vitro methods to determine protein digestibility and their validation with in vivo data. The aim of this work was to determine the in vitro protein and amino acid digestibility of plant-based foods including protein isolates, cooked legumes, soy-derived products, as well as cereal-based foods, and compare the results with standardized ileal digestibility. Furthermore, peptidomics of the ileal contents after ingestion of rapeseed protein isolate was conducted. The ingredients and food products were digested using an in vitro method based on the internationally harmonized protocol INFOGEST and compared with previously measured digestibility in ileal cannulated growing pigs. The in vitro protocol led to similar crude protein digestibility percentages (differences $\leq 5\%$) except for corn flakes and non-heat-treated rapeseed protein isolate, which contained trypsin inhibitors, but that was not the case for the heat-treated product. In vitro amino acid digestibility was also comparable with the values determined in vivo, with a few exceptions for soy-derived products and quick rolled oats, but the absolute percent error was less than 30% in all cases. For wheat-based products, observed differences were ascribed to total lysine vs. reactive lysine determination. In rapeseed protein, the peptide profile at the ileal level showed that inactivation of the trypsin inhibitors by heating improved the digestibility of the storage protein cruciferin, while napin was intrinsically more resistant to digestion, with occurrence of napin-derived peptide sequences rich in glutamine and proline. The in vitro digestion protocol reproduced to a good extent values for protein and amino acid digestibility determined in ileal cannulated pigs, with the exception of samples containing trypsin inhibitors, although this can be overcome by the adjustment of the substrate load. In comparative studies, it is also important to consider the food matrix state (moist vs. dried), as well as the particle size and the changes that the food product may undergo as a result of storage or handling.

Keywords: ileal protein digestibility, DIAAS, in vitro digestion, plant-based food, rapeseed, peptidomics

Poster #14: Honey from the stingless bee *Tetragonisca angustula* as a novel source of potentially beneficial bacteria

Gabriela R. Silva; Elaine C. P. De Martinis

Ribeirão Preto School of Pharmaceutical Sciences – University of São Paulo, Brazil

edemarti@usp.br

Honey has been regarded as a healthy food for millenia but the knowledge on the chemical and microbial composition of diverse samples is still challenging because it depends on the foraging plants, environmental factors and, very importantly, the species of the producing bees. There has been increased interest in honeys from stingless bees (SB) and there are over 600 species in tropical and sub-tropical countries. So, the objective of this research is to search for bacteria with antimicrobial potential in spontaneously fermenting honey samples from the SB *Tetragonisca angustula* (named popularly as “Jataí”). For that, two samples (A and B) were collected in the region of Ribeirão Preto (São Paulo, Brazil) and the fermentation was done at 25°C in vials with airlock, for up to six months. Microbial enumeration was done weekly for 1 month and monthly thereafter, depending on sample availability, using for that culture media targeting the isolation of Lactic Acid Bacteria (LAB) and Fructophilic Lactic Acid Bacteria (FLAB) with antimicrobial activity against the indicator *Latilactobacillus sakei* ATCC 15521, using agar overlay method. Key physico-chemical parameters of honey during fermentation were also determined (pH, titratable acidity, water activity, and moisture). The bacterial isolates were identified by MALDI-TOF. The results showed a pH drop (lower value of 3.0) and increased acidity (highest value of 74 mEq/kg) at the end of fermentation time (6 months). From honey sample B were isolated two *Latilactobacillus sakei* (G104 and G105) besides two *Weissella paramesenteroides* isolates (G99 and G100). Interestingly, *Bacillus* spp. also grew on MRS plates and, four isolates with antimicrobial activity were identified from samples A and/or B, to know *Bacillus subtilis* (samples A and B – isolates G97, G109 and G110) and *Bacillus coagulans* (sample B – isolate G112). Taking into account that some of these species present application as commercial probiotics, the isolates obtained in this study will be further investigated for beneficial properties using appropriated models. Funding: FAPESP (2013/15005-0) and CNPq (306998/2022-0).

Keywords: honey diversity; stingless bees; *Bacillus* sp.; Lactic Acid Bacteria

Poster #15: Evaluating the digestive profile and microbiota-driven health effects of locally produced fruits in the Greater Region

Ninive Montserrat Aguilar Trujillo, Manon Gresse, Irma Gonza-Quito, Brunette Katsandegwaza, Véronique Dalcenserie

Department of Food Sciences, FARAH - Veterinary Public Health, University of Liège, B43b, 4000 Liège, Belgium

nmaguilar@uliege.be

Introduction: Despite the proven beneficial health effects of fruit consumption, around 30% of food waste in the Greater Region (France, Belgium, Germany and Luxembourg) corresponds to fruits, while fruit intake remains below dietary guidelines recommendations (EUROSTAT, 2025; Sciansano, 2023). Locally produced fruits (apples, pears, grapes, mirabelle plums, and strawberries) are important sources of micronutrients and bioactive compounds (WHO, 2026). Furthermore, whole fruits provide substrates that reach the colon, where the gut microbiota transforms them into bioactive compounds that may benefit the host, such as short-chain fatty acids produced from dietary fiber fermentation and polyphenol metabolites (Armet et al., 2022). However, studying whole fruits' effects on microbiota-driven responses presents methodological challenges, as compounds normally absorbed in the small intestine must be removed to accurately simulate colonic exposure.

Objectives: As part of the GReen Logistik project, this study aims to assess how locally produced fruits influence microbiota-driven health outcomes. For this, in vitro digestion models will be used to determine the digestive profile of local fruits and the transformation of fruit components by the gut microbiota.

Methods: The INFOGEST protocol is a widely accepted international consensus method for simulating upper gastrointestinal digestion (Brodtkorb et al., 2019; Minekus et al., 2014). This study proposes to use INFOGEST-based in vitro digestion protocol for local fruits, adapting enzyme concentrations and post-digestion handling to improve physiological relevance prior to inoculation in in vitro fermentation models. Absorbable and non-absorbable compounds from fruits will be separated and analyzed to assess changes in sugar availability and antioxidant activity during in vitro digestion.

Results and Conclusions: This work is currently in progress. Preliminary efforts focus on adjusting enzyme concentrations and treatment of the samples during stomachal and ileal digestion. This approach is expected to enhance our understanding of how locally produced fruits influence microbiota-driven health effects, supporting evidence-based strategies to promote fruit consumption and improve the nutritional regional environment.

GReen Logistik is a project founded by the Interreg program, as a cross-border cooperative initiative in the Greater Region.

Keywords: Fruit, Microbiota, Intestinal health, In vitro

Poster #16: Enzymatic predigestion of whey to assess its impact on gut microbiota using in vitro digestion models

Manon Gresse¹, Ninive Montserrat Aguilar Trujillo¹, Clara De Martinis², Irma Elizabeth Gonza-Quito¹, Brunette Katsandegwaza¹, Véronique Delcenserie¹

¹ Laboratory of Food Quality Management, Department of Food Sciences, FARAH - Veterinary Public Health, University of Liège, B43b, 4000 Liège, Belgium

² Faculty of Animal Science and Food Engineering - FZEA / USP, University of São Paulo, Pirassununga - SP, 13635-900, Brazil

manon.gresse@uliege.be

Whey, a by-product of cheese production, accounts for around 50 million m³ annually in the European Union, yet remains partly underutilized, raising environmental concerns within the dairy sector (Rao et al., 2021). Previous studies have shown that whey-derived proteins and fermented dairy components can modulate gut microbiota composition and support intestinal health (Ashaolu et al., 2026; Smith et al., 2020). This evidence highlights whey as a promising substrate for the development of sustainable, value-added food products. In addition, whey-derived substrates may reach the colon, where they interact with the gut microbiota and are metabolized into bioactive compounds, including short-chain fatty acids, influencing intestinal health and microbial activity. Nevertheless, studying these microbiota-driven effects remains challenging, as digestion and absorption processes in the upper gastrointestinal tract must be accurately simulated to determine the fraction reaching the colon.

This study aims to evaluate the enzymatic predigestion and absorption of whey prior to assessing its impact on the intestinal microbiota.

Since whey proteins and lactose are primarily digested and absorbed in the proximal gastrointestinal tract, it is essential to characterize these processes before investigating colonic effects. A simulation of the upper gastrointestinal tract will be carried out using the INFOGEST 2.0 protocol (Brodkorb et al., 2019). The outcome will be a predigested whey-based product suitable for inoculation into more complex in vitro fermentation models such as the SHIME system (Goya-Jorge et al., 2024). Preliminary analyses will focus on changes in whey composition before and after in vitro digestion, including protein structure, lactose availability, and macronutrient distribution, to characterize the fraction available for microbial fermentation.

This work is currently in progress. Preliminary efforts focus on optimizing enzyme concentrations and digestion conditions during gastric and ileal phases. This approach is expected to improve understanding of how whey-derived compounds influence microbiota-driven responses, supporting the development of sustainable, value-added dairy products with potential benefits for intestinal health. This research is part of the ALAFERM project, an Interreg Greater Region initiative co-funded by the European Union, addressing the valorization of agri-food by-products and the sustainability of the dairy sector.

Keywords: Whey, Gut microbiota, In vitro digestion, INFOGEST protocol, Agri-food by-products

Poster #17: Are probiotics a safe and efficient potential alternative to metronidazole for the treatment of bacterial vaginosis? A unique preliminary study

OZBASLI Esra¹, ALBAYRAK Nazli¹, KUCUK Tansu¹, EL KERTAOUI Najlae², RAIMOND Olivier²

¹ Acibadem Maslak Hospital, Dept Obstetrics & Gynecology, Istanbul, Turkiye

² BellaVie, Parc Food is Life, 5060 Tamines, Belgium

olivier@bellavie.eu

Introduction: Conventionally, Bacterial Vaginosis (BV) is treated with antibiotics. However, antibiotics often lead to frequent relapses and subsequent candida infections despite providing short-term relief (1,2). This study compares the microbiota response to antibiotic and probiotic treatments under the same scheme.

Materials and Methods: The study included 23 BV cases in a randomized, controlled, open-label trial. 2 groups of patients were treated orally (2 per day). Group I (n=14) received a food supplement (BellaVie Woman), which contains probiotics and cranberry. Group II (n=9) received metronidazole (Flagyl 500 mg). Microbiota samples were collected from both groups on the day of diagnosis and one day after treatment and analyzed using 16S sequencing by a certified laboratory.

Conclusion: The study found that the total biomass increased after treatment in the metronidazole group due to candida infection. Additional treatment for candida vaginitis was given to 4 out of 9 patients on the control day. In Group I, a significant increase in *Lactobacillus* spp. was demonstrated after treatment, while an opposite effect was detected in Group II ($p < 0.05$). A similar effect was demonstrated in *Lactobacillus* subgroups including *L.acidophilus* and *L.rhamnosus* ($p < 0.05$). These findings suggest that probiotics are not inferior to antibiotics, even under adverse conditions that deviate from the original treatment schemes.

Keywords: Vaginosis - Synbioceutical - Metronidazole - Cranberry - Candida - Probiotic