



Abyss Ingredients

Caudan, France

Improving the Sensory Quality of Marine Collagen

ABOUT THE COMPANY

Abyss Ingredients is an ingredient company based in Brittany, specialising in the valorisation of marine resources and fish-processing by-products into high-value ingredients for nutraceutical and functional applications. The R&D team works together with universities and CROs on innovation and new developments to respond to the growing demand for natural and sustainable healthy-aging solutions.

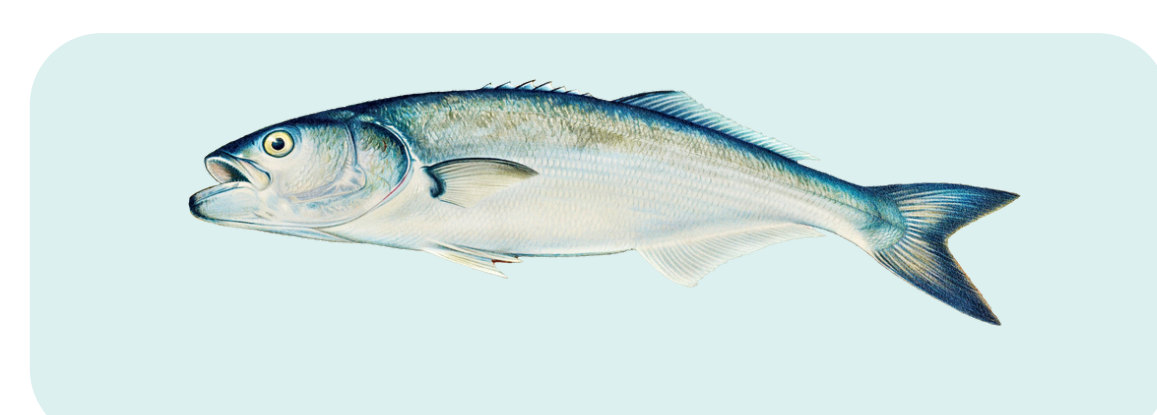
THE CHALLENGE

Abyss Ingredients marine collagen ingredients, Cartidyss, although having promising applications in joint health and beauty-from-within products carries a typical "fishy" flavour and smell — a barrier in a collagen market where competitors are flavourless. This fish odour makes it a "No Go" for cosmetic applications and clients, despite the collagen market booming with fierce price, quality and clinical competition.

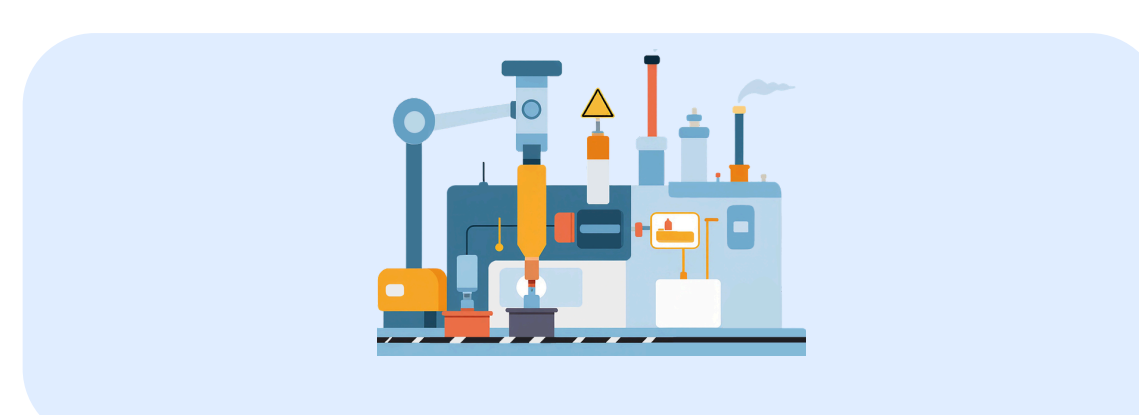
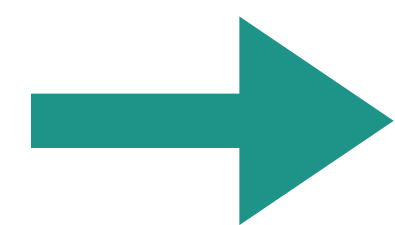
DESCRIPTION OF THE PROJECT

This project aimed to develop an innovative process to reduce undesirable fish odours, improving the ingredient's overall aromatic profile while preserving its nutritional and functional properties. The project evaluated and validated innovative biotech deodorisation processes from both a technical and financial standpoint, with the goal of scaling up the best-performing option and opening the ingredient to new markets such as cosmetics.

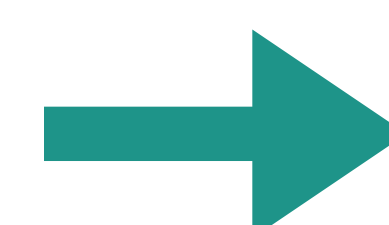
From a marine by-product ingredient to a premium, market-ready product



Raw marine
ingredients



Deodorisation
routes explored



Premium ingredient
for new markets

RESULTS & IMPACT

THREE ROUTES EXPLORED

Double petreatment
cleaning
EXPLORED

- ✓ Effective at pilot scale
- ✗ Not Industrially feasible

Absorption resins
CURRENT FOCUS

- 4 resins screened ;
1 selected for column trials
- ✓ Most promising route

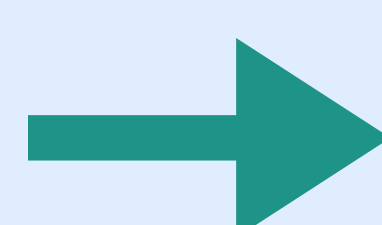
Activated carbon
filtration
EXPLORED

- ✓ Better colour and odour
- ✗ Insufficient deodorisation
Higher costs

MOST PROMISING DIRECTION IDENTIFIED : ADSORPTION RESINS

Further technical & economic evaluation ongoing

TRL6



TRL9

Activated carbon filtration
measurably improved **colour and odour** across 3 industrial runs

Developed with industrial partners
Eurofiltration & IDMer

Every route tested generated
valuable technical knowledge for
the next development phase



Scan Me

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 Abyss Ingredients



Avecom

Ghent, Belgium

Sustainable solutions for environmental recovery and side stream valorisation

ABOUT THE COMPANY

Avecom is an SME that emerged as a spin-out company from the University of Ghent (UGent). Avecom's specialisation lies in the fields of biodegradation, microbial fermentation and the engineering of microbial consortia. These competences enable us to offer **sustainable and cost-effective solutions for environmental remediation and biomass fermentation**. Within our portfolio, Avecom has developed diverse biomass fermentation platforms, originating from byproducts generated by food, agro and other industries.

THE CHALLENGE

Apple pomace is a readily abundant by-product of the fruit industry that currently lacks efficient processing pathways. Its **organic compounds are not sufficiently bioavailable** for efficient microbial conversion.

Avecom therefore needed to develop a robust and scalable process able to release these compounds, convert them into microbial biomass and recover a stable protein-rich ingredient suitable first for animal feed, and ultimately for human consumption.

DESCRIPTION OF THE PROJECT

The project aimed to establish a **robust, stable and cost-efficient microbial protein production process** through biomass fermentation, starting from apple pomace. The project covers all processing steps from raw material to end-product :

- Pretreatment strategies evaluation and selection, to make carbon sources more bioavailable
- Fermentation optimisation, testing mono- and co-culture strategies
- Downstream processing (centrifugation and spray drying) to obtain a protein-rich single-cell protein (SCP) powder

Production was optimised at lab-scale and scaled up to a pilot-size bioreactor.



RESULTS & IMPACT

Pretreatment optimised

Heat + pressure treatment
combined with enzyme addition
+ filtration and sterilisation

✓ High COD conversion, low solid residues

Fermentation demonstrated

Candida utilis mono-culture fermentation

✓ **Scale-up validated** from 5L to 30L,
with stable biomass and protein
yields

Downstream processing tuned

Centrifugation + Spray-drying

Protein content monitored
throughout the process



Industrial production validated

30L

Pilot bioreactor purchased &
validated

1.9 kg

of microbial biomass recovered per
pilot run



Nutritional composition of the final SCP powder

45.3g

Protein /100g

34.5g

Dietary fibre /100g

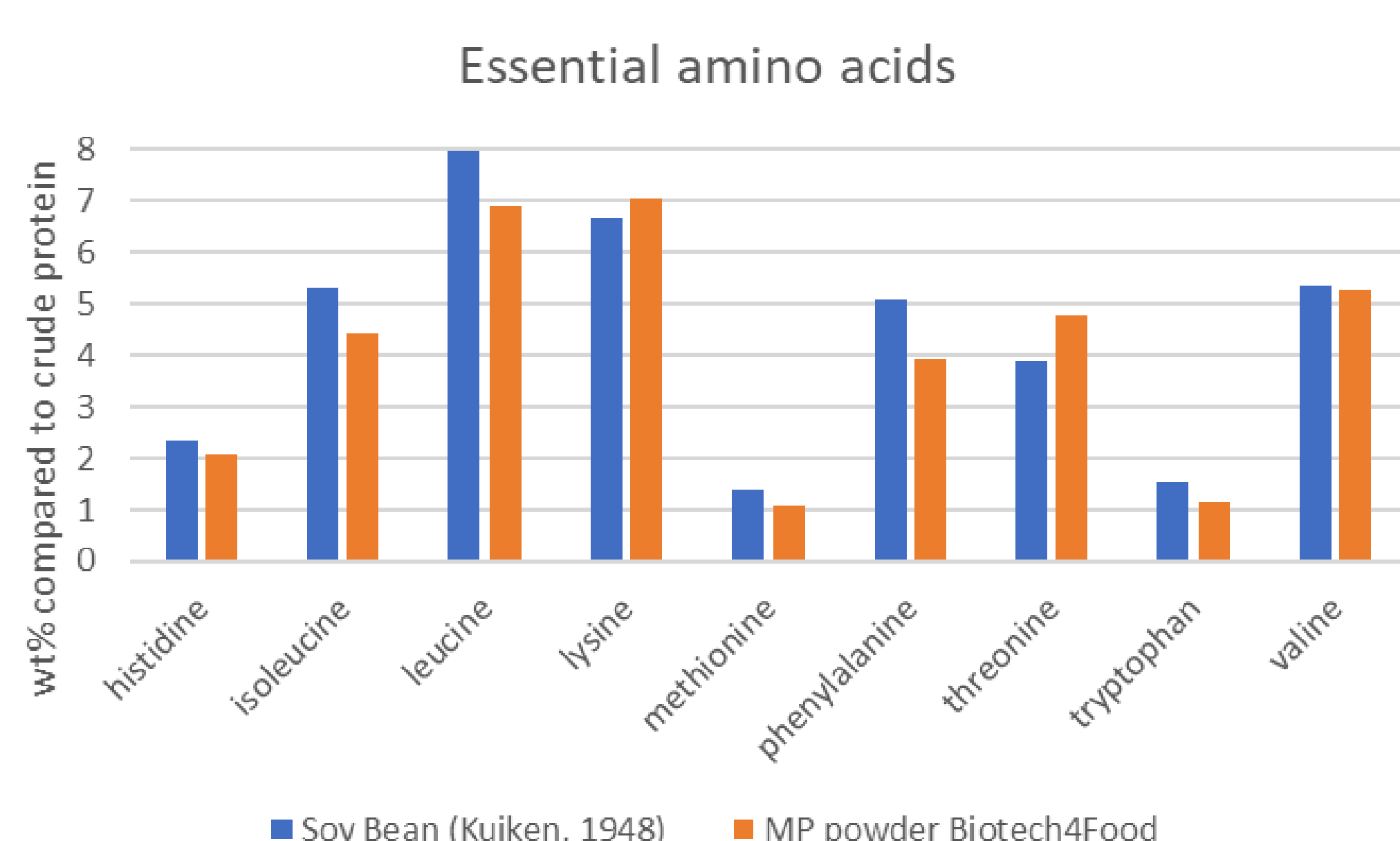
0.291g

Polyphenols (GAE)
/100g

71.5%

Of total protein is
digestible

All **EAA**
present



Techno-economical assessment : Break-even point

Current : €56.42/kg

Optimisation scenario : €20.63/kg



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 Avecom



Artechno

Gembloux, Belgium

Scaling-up more efficient and sustainable microbial fermentation

ABOUT THE COMPANY

Artechno is a **specialist in microbial solutions** developed from fermentation of bacteria, yeast and fungi. Supported by more than 1,000 scientific papers, eco-friendly solutions are proposed to our partners to meet the challenges of healthy eating, of finding natural solutions in animal feed and plant nutrition. Artechno's know-how is particularly developed in SPORE FORMING BACTERIA (mainly BACILLUS species)

THE CHALLENGE

As demand for microbial solutions grows, Artechno needed to increase its **production capacity** while reducing **production costs and energy consumption** to remain competitive on international markets.

This required optimising several critical steps of microbial production: oxygen transfer during fermentation, biomass recovery and drying conditions.

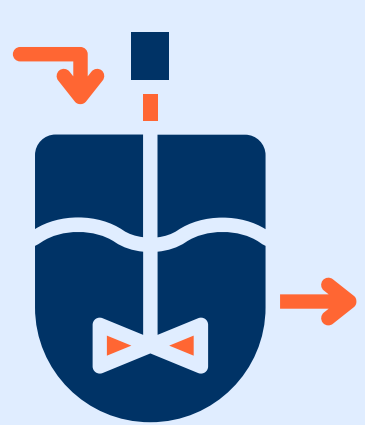
DESCRIPTION OF THE PROJECT

This project aimed to increase Artechno's industrial fermentation capacity while improving the efficiency, flexibility and sustainability of its microbial production processes. particular focus was given to aeration conditions to reduce the energy intensity of fermentation.

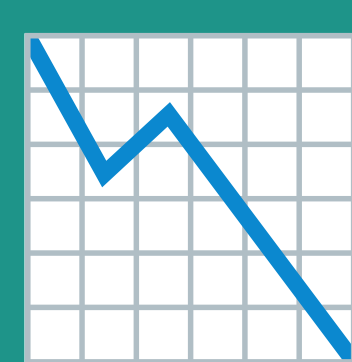
The work followed five main steps:

- Optimising fermentation conditions through **better aeration and oxygen-transfer**
- Improving biomass recovery and drying,
- Upscaling the process

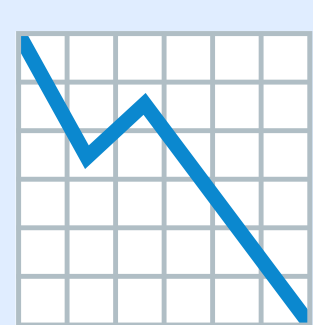
RESULTS & IMPACT



8 000L fermenter
installed



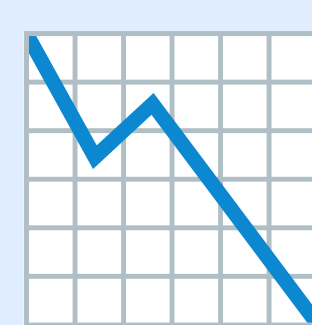
Increased production capacity
From 300 000L to **500 000L** of
fermented media/year



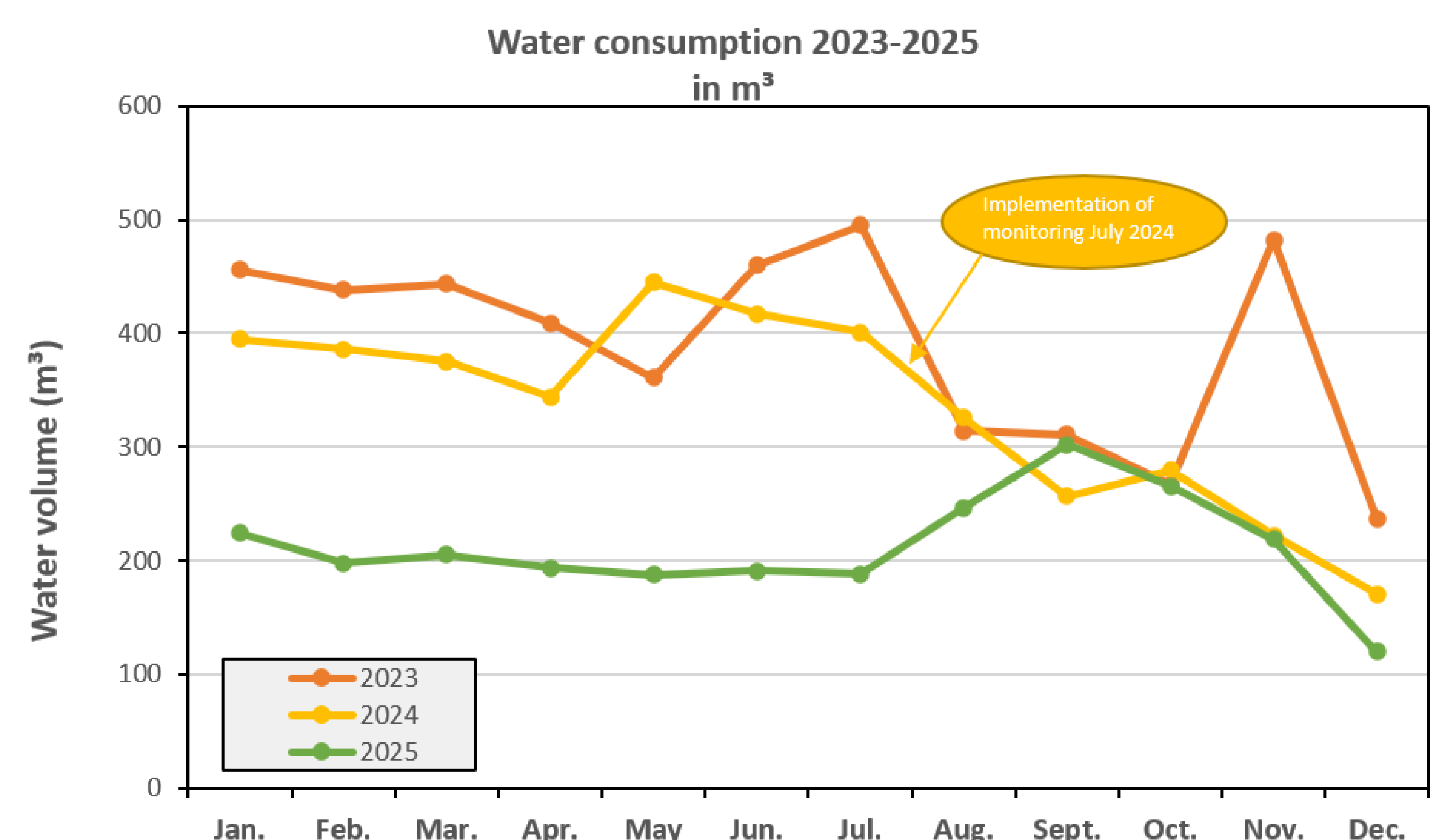
Optimised process
for the production
of difficult strains

1

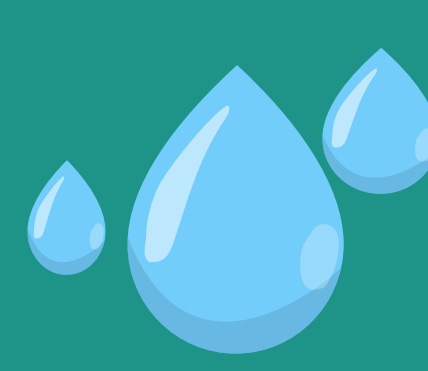
New Gram-
negative strain
introduced on
market



Anaerobic strain
production set-up



Reduced **energy consumption**



Reduced **water consumption**



Overall reduced **production cost**



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in ARTECHNO sa



BCF Life Sciences

Pleucadeuc, France

Automating amino acid production for greater efficiency

ABOUT THE COMPANY

BCF Life Sciences specializes in the extraction of **natural and free amino acids** 100 % traced origin. BCF Life Sciences operates in three main markets which are Human Care (pharmaceuticals, food supplements and infant formula), Pet Care (veterinary diet) and Plant Care (biostimulants). BCF Life Sciences ingredients are marketed by the leading names in those fields.

THE CHALLENGE

BCF Life Sciences needed to **secure and increase its amino acid extraction capacity to meet sustained customer demand**, while maintaining the high quality and safety standards required for human-health markets.

The company therefore aimed to modernise and automate key production steps, reduce process variability, increase repeatability and capacity, and improve production monitoring, while preserving product quality and operational safety.

DESCRIPTION OF THE PROJECT

The project focused on the **automation and modernisation** of several key steps in BCF Life Sciences' **amino acid extraction process** to increase capacity as well as considering safety and quality stakes. It focused on standardizing manufacturing process, reducing its variability, and improving its energy performance.

The project covered three main stages:

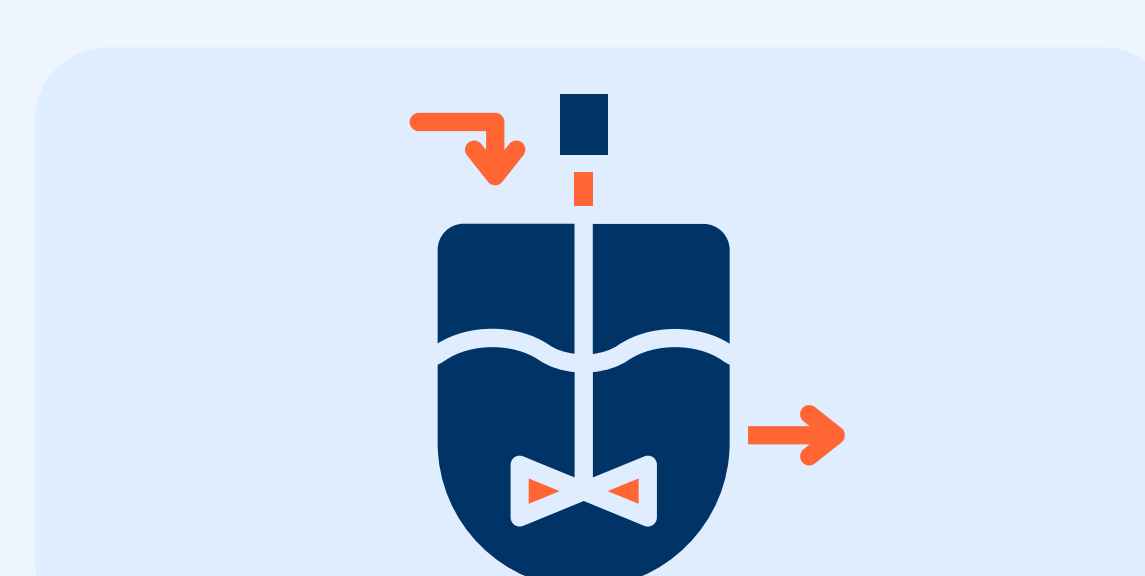
- Engineering and equipment design, including detailed specifications and supplier selection.
- Implementation of automated process steps, focusing on feather pressing, maceration and hydrolysis.
- Testing and validation of the new equipment and predefined production recipes.

The investment introduced automated recipes, greater process standardisation and remote production monitoring, with the objective of increasing productivity while strengthening quality and safety.

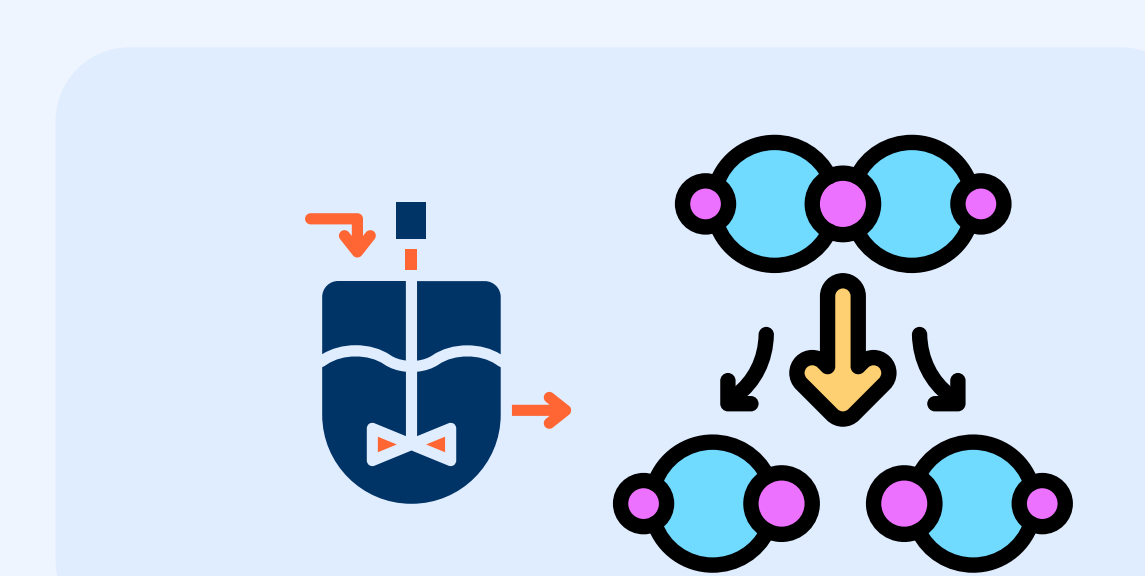
3 major production steps
fully implemented and
validated



Feather pressing



Maceration



Hydrolysis

TRL6



TRL9

RESULTS & IMPACT



Improved remote
production monitoring



Shorter and more
controlled **cycle times**



Increased **production
repeatability**



Improved **production
ramp-up**



Exploitation of results

The automated equipment and standardised production recipes are now integrated into BCF Life Sciences' industrial operations and will support higher production capacity, improved repeatability and continued productivity gains, while further automation of concentration and dilution steps are planned.



Scan Me

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 BCF Life Sciences



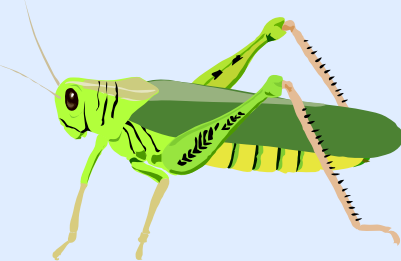
Bugslab

Parma, Italy

Multi-enzymatic treatment of insect flour to increase digestibility

ABOUT THE COMPANY

BUGSLAB SOC AGRICOLA SRL is an Italian start-up specialised in the production of **insects** (currently crickets and locusts) and **insect based products** (dried crickets and cricket flour). Bugslab's products are currently mostly used in the pet food industry and also starting to be used in the feed and food industries as legislation has evolved to open these new markets. Bugslab also develops insect rearing technology and industrial processes to continuously improve the efficiency of its production.



THE CHALLENGE

A key challenge in the uptake of insect-based ingredients is the **limited digestibility and bioaccessibility of the proteins**. Although insect biomass is naturally rich in protein, its complex structure, including the presence of chitin, can limit the accessibility of proteins during digestion. This may reduce the nutritional value that can actually be obtained from the ingredient and represents an important barrier to the development of high-quality insect-based food and feed products.

DESCRIPTION OF THE PROJECT

The project aimed to develop a biotechnological process using proteolytic and chitinolytic **enzymes to improve the digestibility, safety, and functional properties of insect flours**. It focused on enhancing protein and chitin bioaccessibility to deliver more nutritious and less allergenic ingredients for food and feed. It followed a three step workflow :

- Optimization of enzymatic breakdown on raw insect paste
- Production and full characterization of insect flour prototypes
- Scale-up of production and evaluation of potential end markets

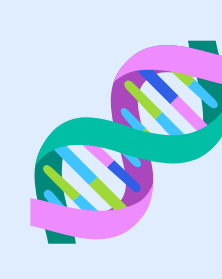
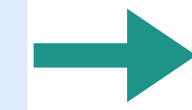
RESULTS & IMPACT



Raw biomass
characterised



Enzymatic
hydrolysis

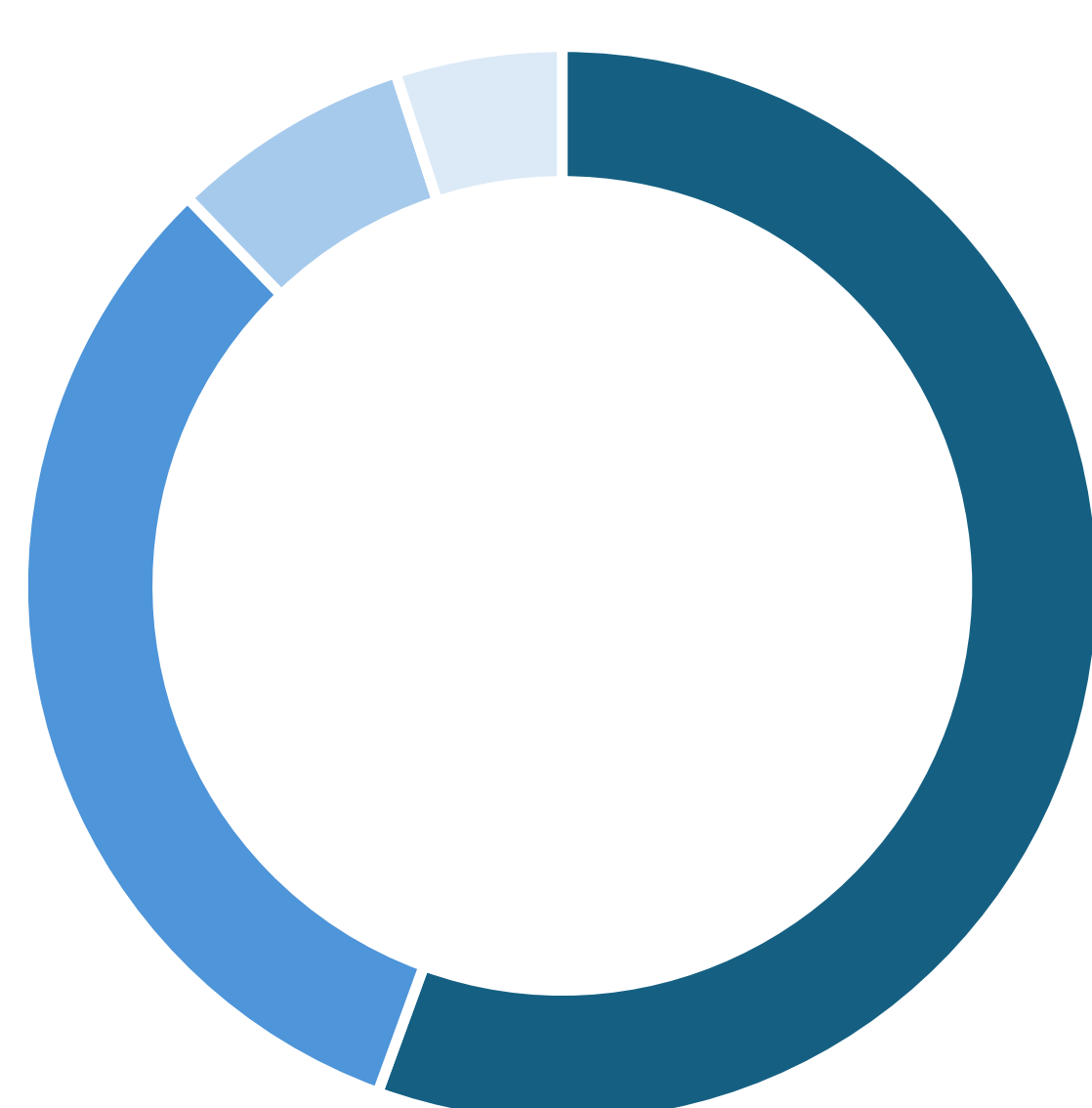


Digestibility
validated



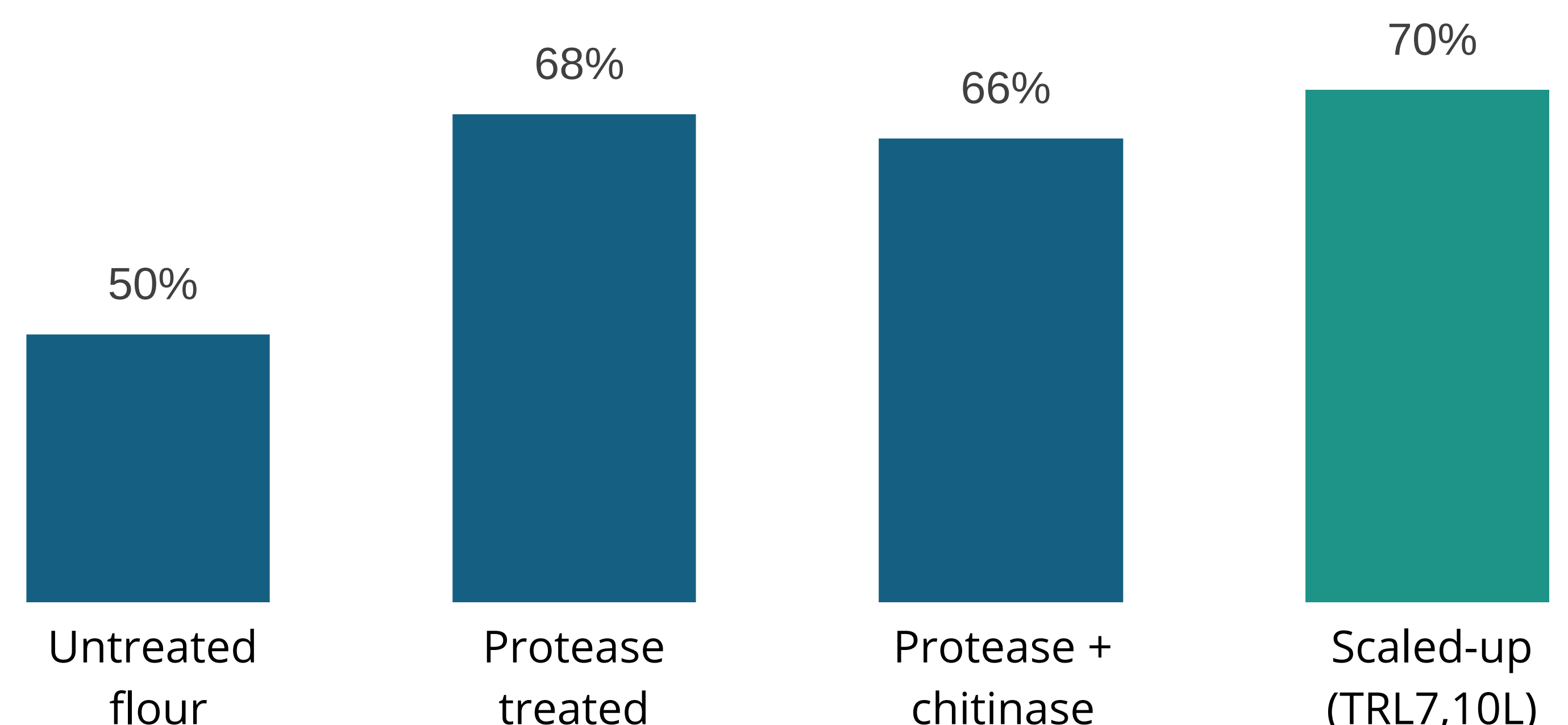
Scaled up
TRL7 · 10L bioreactor

Raw material composition



Proteins **50%**
Lipids **29%**
Chitin **6.5%**
Minerals **4.5%**

Degree of Hydrolysis (DH%) — effect of enzymatic treatment & scale-up



Measured after INFOGEST simulated gastrointestinal digestion. Improvement mainly driven by protease treatment; chitinase adds no further effect under tested conditions.

Deep analytical validation

Confirmed total and hydrolysed protein levels via Kjeldahl, OPA-NAC, ¹H-NMR and UPLC-MS. Likely reduced allergenic potential; COS release very limited even after 24h of chitinase treatment.

Backed by science

In-vitro digestibility (INFOGEST protocol) carried out with the University of Parma, ensures rigour and alignment with food-grade safety standards.

Ready for production

Validated at TRL7 and transferable to an operational environment; market considerations outlined in the Future Exploitation Plan.

Overall outcome

The enzymatic process using proteolytic and chitinolytic enzymes was validated from lab scale through to TRL7 industrial-relevant scale, consistently improving protein bioaccessibility in insect-derived raw materials — a key step towards more nutritious and less allergenic food and feed ingredients



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 Bugslab



Calidris Bio

Calidris

Antwerpen, Belgium

Advancing efficient and scalable microbial protein production

ABOUT THE COMPANY

Calidris Bio is a biotechnology company producing **bacteria Microbial Protein (MP)** for food and premium feed applications. It utilizes **CO₂-derived renewables** as carbon feedstock producing a next-generation alternative protein completely independent of agricultural resources. The company stands out from other MP producers in that the product is highly nutritious (>72% protein with a high concentration of essential amino acids).

The Calidris Bio team

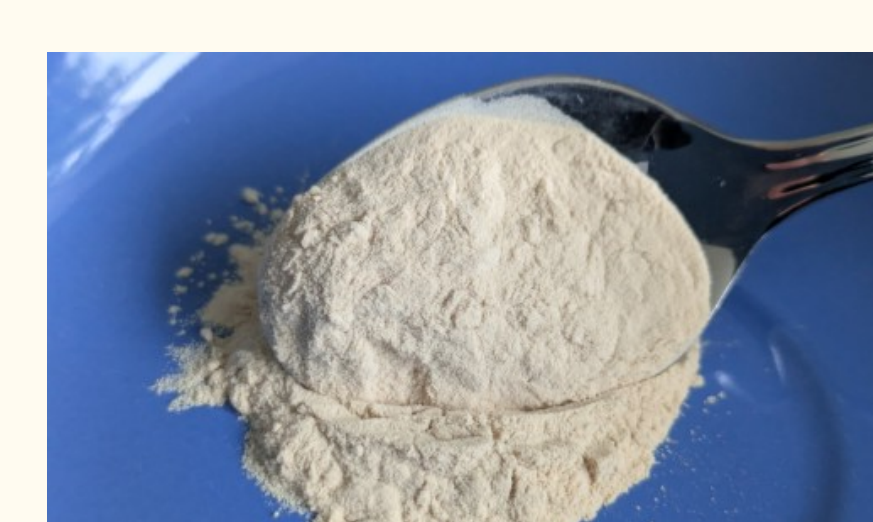


THE CHALLENGES

The **scaling-up of MP production** involves multiple challenges :

- Increasing fermentation productivity and biomass yield
- Transitioning from fed-batch to continuous fermentation
- Optimization of DSP to limit losses
- Ensuring commercial uptake
- Overcoming regulatory barriers

The protein-rich microbial protein CDRISTM



DESCRIPTION OF THE PROJECT

The project aimed to **improve efficiency and economic viability** of the first industrial production runs of Calidris Bio's alternative MP

The work focused on four complementary areas:

- Fermentation optimisation: adjustment of the carbon-to-nitrogen ratio, nutrient composition, dissolved-oxygen conditions and maximum feeding profile.
- Automated process control: automation of carbon-source feeding according to microbial growth and oxygen availability.
- Downstream processing: centrifugation optimisation and evaluation of alternative recovery of the protein-rich supernatant
- Market preparation: engagement with potential customers and preparation of data for the EFSA Novel Food procedure.



RESULTS & IMPACT



> 40%

Improved productivity



80%

Protein recovery,
without raising overall
product cost



4+

Discussions with
potential customers

-55%

Improvement achieved in **production cost**, driven by higher product recovery and improved productivity, conversion rate and yield. Besides price, the **environmental footprint** was reduced by a comparable amount.

Technical roadmap

The production improvements are being integrated directly into Calidris Bio's process. The project enabled the company to establish a technical roadmap towards market-acceptable production costs and a zero-carbon production process. It shows that production price and carbon footprint can be reduced even further to come at par with bulk protein price, producing a **carbon-neutral** — and in future even **carbon-negative** — product.



Market validation

- High product quality and scalability attract petfood and food companies
- Validated as safe for dogs: toxicity, scale-up and palatability trials
- Shown to enrich several food applications, tested in the **Like-a-Pro project**:

Hybrid meat

Mousse

3D printed fish

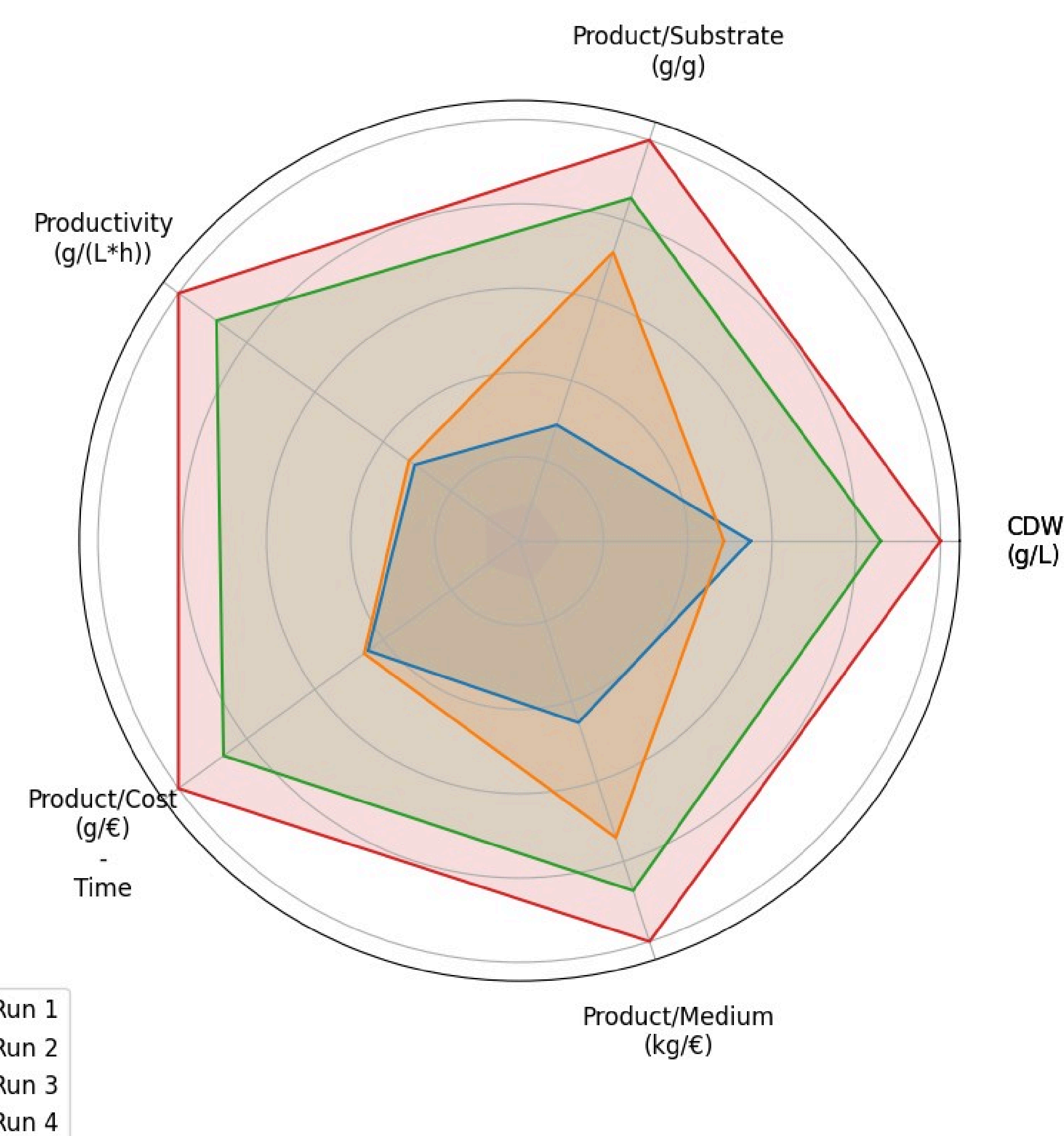
Vegan cheese

Smoothies

17

Novel Food Procedure planned for Q4 2026

Pilot runs



Hybrid Chorizo



Mousse



Like a
PRO



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Lieve Hoflack, Co-founder

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Calidris Bio



COCONT

Clermont-Ferrand, France

Scaling-up fermented plant-based foods

ABOUT THE COMPANY

COCONT is a French food biotech company that develops and industrialises **fermented, clean-label, plant-based foods** that address nutritional needs while reducing environmental impact. They focus on solid-state fermentation, alternative proteins and B2B manufacturing.

The company is committed to ensuring France's food sovereignty, and has positioned itself as part of a process of reindustrialisation through a low-carbon industry.

THE CHALLENGE

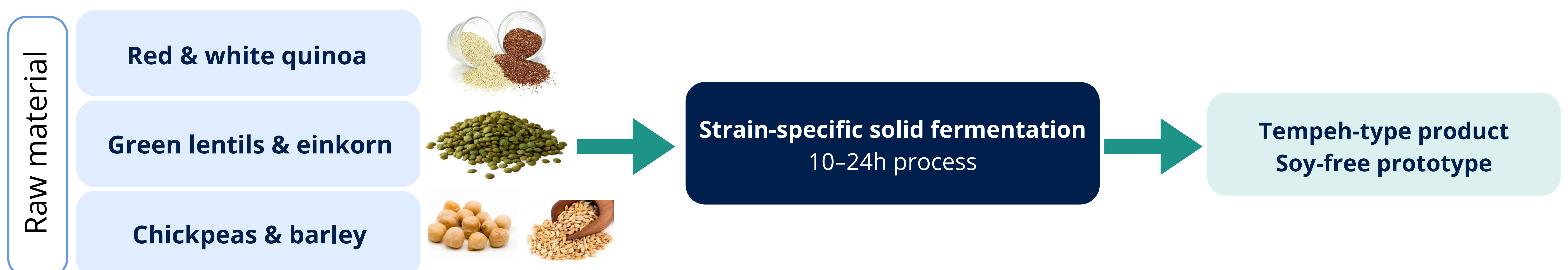
To ensure COCONT's rapid development as a specialist in the manufacture of fermented plant-based alternatives, the company needed to finalise the development of these bioprocesses at an **industrial scale**. This required optimising fermentation conditions and reducing processing time, while ensuring consistent taste, texture and nutritional quality across different plant raw materials. COCONT also needed to adapt its production equipment, integrate process monitoring, and guarantee food safety and quality compliance in order to move from small experimental batches to reliable industrial production.

DESCRIPTION OF THE PROJECT

The project aimed to **industrialise COCONT's solid-state fermentation process** for the production of soy-free, **tempeh-type plant-based products** in controlled conditions — strain selection, temperature, humidity and time. The project focused on three product types, using three different raw material combinations : red & white quinoa, green lentils & einkorn, and chickpeas & barley.

The project followed four main steps:

- Testing and optimising ferment/raw-material combinations
- Adapting industrial equipment and integrating process-control sensors
- Bringing the production site into compliance with food quality and safety standards
- Producing industrial batches using the validated recipes.



RESULTS & IMPACT

Fermentation testing

Three ferment/raw-material pairs tested → feasible recipe optimised for scale-up, with product specification sheets and functional prototypes produced.

Scale-up to industrial production

Machinery adapted and facilities consolidated into a single site

24h→10h

Fermentation time cut with Institut Pascal, using a non-powder ferment — enabling industrial scale-up

300kg

Per batch

Industrial batch production

Producing industrial batches with the developed recipe(s), aiming for large-scale production to sell throughout Europe.

TRL6
Project start



TRL8
Current status



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 Cocont



Crop
Biostimulation
Technologies

EVYP

Thessaloniki, Greece

Biotechnological transformation of plant-based proteins for poultry feed

ABOUT THE COMPANY

EVYP Crop Biostimulation Technologies is an innovative Greek company based in Thessaloniki, with more than 60 years of experience in the development and production of **plant-based, non-GMO hydrolysed proteins and amino acids**. The company specialises in biostimulants and food insectattractants, combining proprietary production expertise with continuous research and collaboration with universities and research institutes.

THE CHALLENGE

The poultry sector faces increasing pressure to improve feed efficiency, animal performance and product quality while reducing environmental impacts and dependence on conventional inputs.

EVYP's challenge was to transfer its long-standing expertise in plant-based hydrolysed proteins from crop biostimulation to the poultry nutrition market.

Project description

The project aimed to develop and validate **plant-based hydrolysed amino-acid formulations for poultry nutrition**. This required adapting EVYP's proprietary hydrolysis technology to develop a safe, stable and nutritionally balanced feed additive. The project covered three main steps:

- Formulation optimisation
- Performance validation: the formulations were tested on broiler chickens under practical farming conditions
- Economic and commercial assessment

RESULTS & IMPACT --- Experimental validation

4 formulations evaluated on broiler chickens

Control

MX

2427

2438

23017

DATASET

300

broilers - 5 groups

21 → 53

dosing days → endpoint

1,446

flock-weight
measurement

726

individual body
measurements

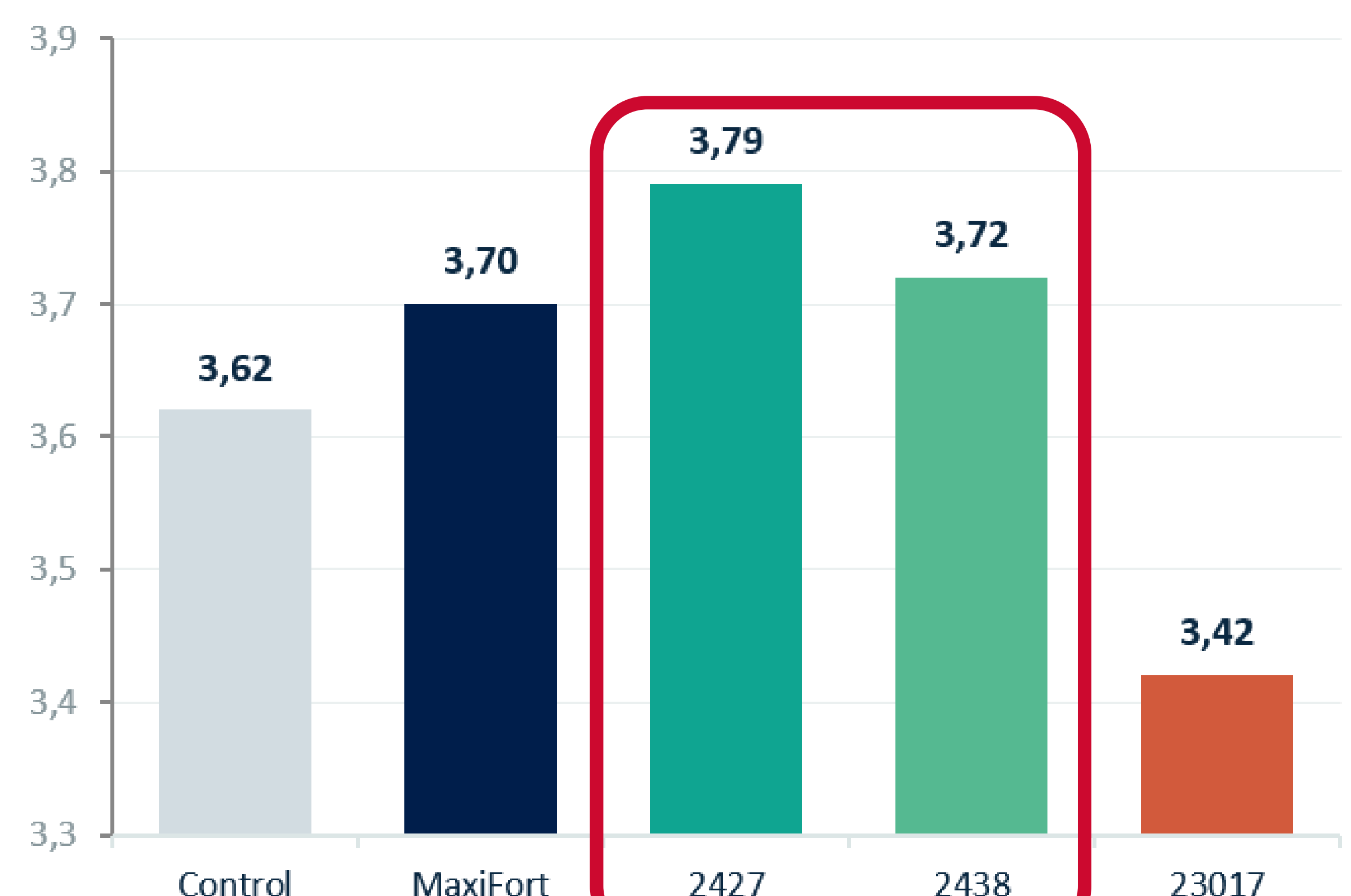
40

microbiome samples

48

meat quality analyses

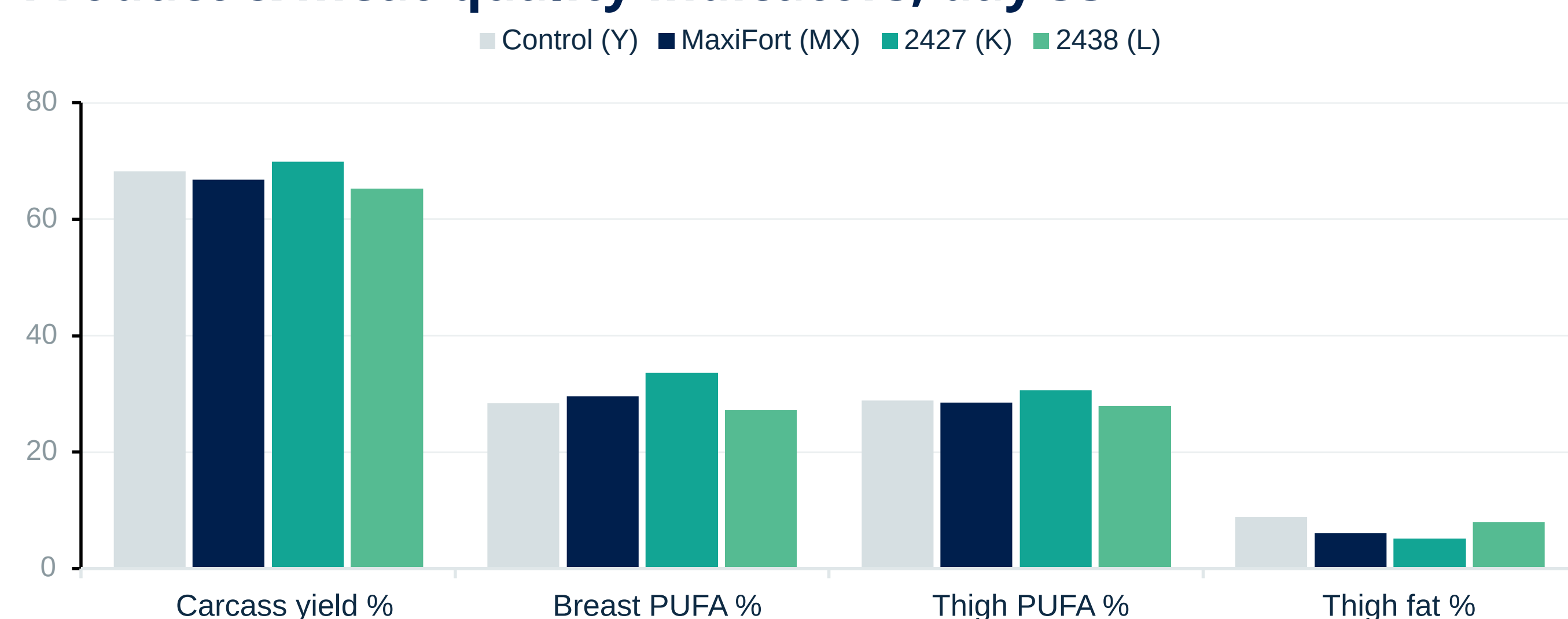
Mean live weight at day 53



RESULTS & IMPACT --- quality and market

The trial identified 2427 and 2438 as the most promising formulation routes: comparable or improved production indicators, a better fatty-acid profile and a favourable gut-microbiome observation at day 53.

Product & meat-quality indicators, day 53



Before → After comparisons

Control breast PUFA 28.35% → **33.63% in 2427**

Control carcass yield 68.22% → **69.90% in 2427**

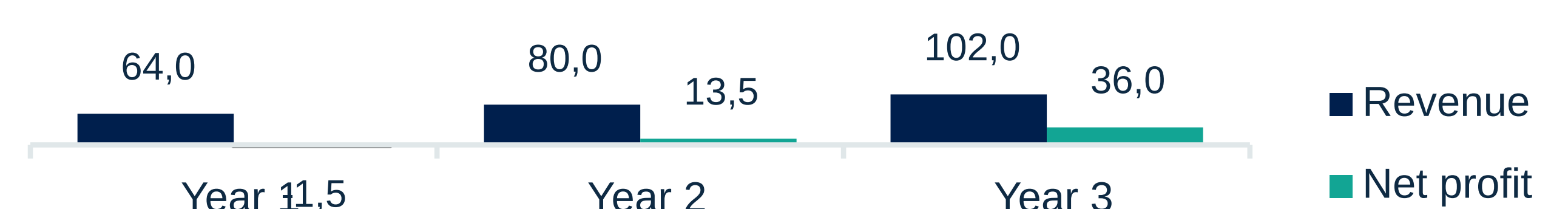
E. coli detected in control / MaxiFort → **No detection in 2427 and 2438 trials**

Existing crop-biostimulant platform → **New B2B poultry-nutrition market**

MARKET IMPACT

- New market entry : plant-based amino-acid additive for broiler nutrition.
- Target: 1,117 farms ; first 15–20 largest producers. Price €8/L.

COMMERCIAL PROJECTION (€000)



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in E.B.Y.Π E.E./ EVYP LLP



Hifas Innovation Hub

Pontevedra, Spain

Scaling-up production of mushroom based foods for special medical purposes (FSMPs)

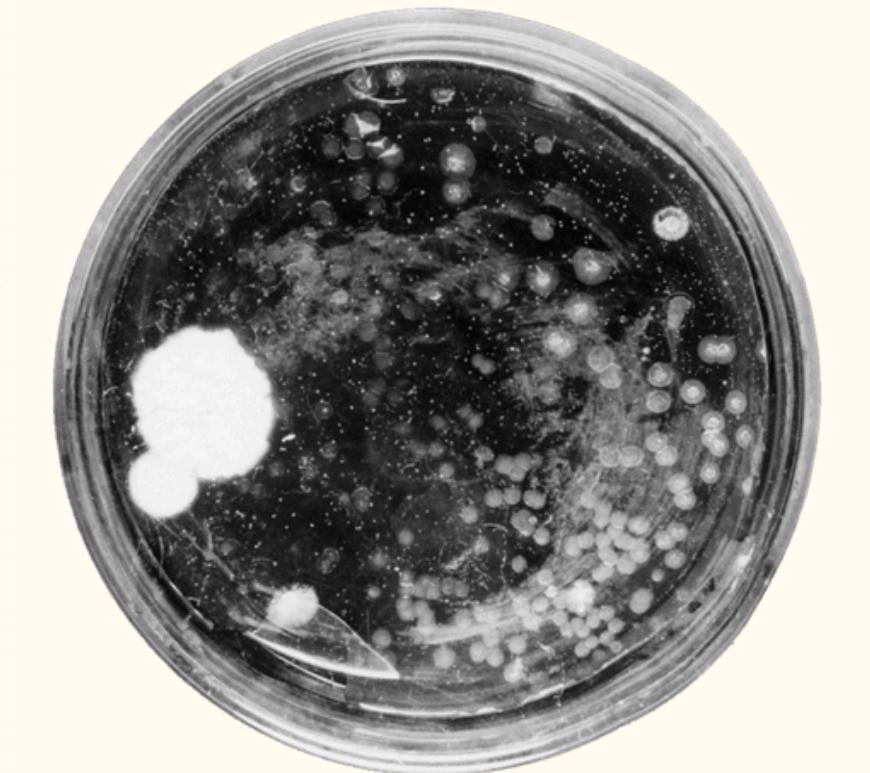
ABOUT THE COMPANY

Hifas Innovation Hub is the cross-functional innovation arm of HIFAS Group, positioned as a disruptive **innovation hub** dedicated to driving the development of biotechnology-based products, innovation services. It is part of HIFAS Group, backed by more than 20 years of expertise in turning functional fungi research into innovative, market-ready solutions.

Through this project, Hifas expanded its activities into a new product category: **food for special medical purposes** — FSMP — intended for oncology patients at risk of malnutrition.

THE CHALLENGE

The challenge was to develop a scalable and sustainable **fungal ingredient with enhanced functionality**, while improving resource efficiency through the valorisation of agri-food by-products, and to incorporate it into an FSMP with improved immune functionality for oncology patients at risk of malnutrition.



Print of the culture plate which started the work on Penicillium (25 years old, and never dried up)!

DESCRIPTION OF THE PROJECT

The project focused on **scaling up the production of a beta-glucan-rich *Hericium erinaceus* mycelial extract** and incorporating it into a Food for Special Medical Purposes (FSMP) for oncology patients at risk of malnutrition. Hifas' innovative liquid fermentation process enabled controlled and reproducible production of the fungal ingredient, while improving resource efficiency and reducing waste, material consumption and environmental impact. The work was organised around four main stages:

- Industrial fermentation scale-up in a 100-L bioreactor
- Ingredient characterisation and immunomodulatory activity validation through in vitro analysis
- Formulation of FSMP with obtained extract, followed by sensory optimisation
- Nutritional, functional and stability validation of formulated FSMP

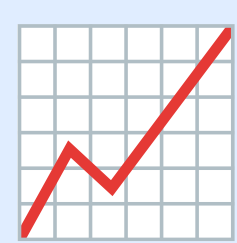
RESULTS & IMPACT



100L

Functional ingredient upscaled

From lab to industrial 100-litre bioreactor scale



Higher

Beta-glucan level

Compared with commercially available functional ingredients



2

Validated FSMP formulations

Beta-glucan-rich strawberry & cappuccino valour products



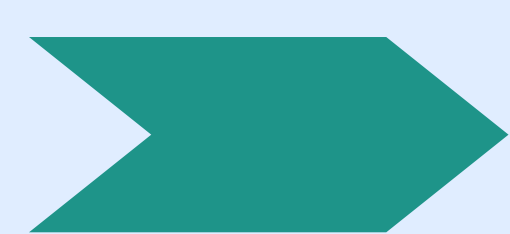
Compliance with established nutritional, microbiological and stability requirements.

Ingredient performance

The mycelial *Hericium erinaceus* extract contained higher beta-glucan levels than the commercial fruiting-body extract used as a comparator.

In vitro analyses also showed a greater reduction in the mRNA expression of IL-1 β and IL-8 with the mycelial extract than with the comparator extract. These results support the ingredient's immunomodulatory potential, implying a greater decrease in inflammation

TRL6
Project start



TRL8
Current status

Market & Strategic Impact

A differentiated FSMP based on fungal β -glucans enables Hifas to enter a new category in specialised medical nutrition.

- **Full production control:** greater internal control over the production process, ingredient quality, beta-glucan content and supply of the *Hericium erinaceus* extract
- Expanded portfolio: Hifas expanded its portfolio from food supplements into specialised medical nutrition — results obtained during the project will support future development and market introduction of the product
- Positioning the company in oncology-focused medical nutrition



Sustainability Impact

A more efficient, scalable and sustainable production model.

- Turning agri-food by-products into value
- Lower waste and resource consumption



Scan Me

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 Hifas Innovation Hub

Contact



Ingredalia

Milagro, Spain

Enzyme assisted extraction of bioactive compound from vegetal byproducts

ABOUT THE COMPANY

INGREDALIA S.L. is an innovative technology-based company located in Milagro (Navarra) specialising in the **valorisation of agri-food by-products into high-value functional ingredients**. Its activities focus on developing more sustainable extraction and processing routes for plant-derived bioactive compounds used in food, nutraceutical and other B2B applications.

DESCRIPTION OF THE PROJECT

The project developed an **enzyme-assisted extraction (EAE) process** followed by membrane filtration for the recovery of bioactive compounds from broccoli and thistle by-products.

The project followed three main steps:

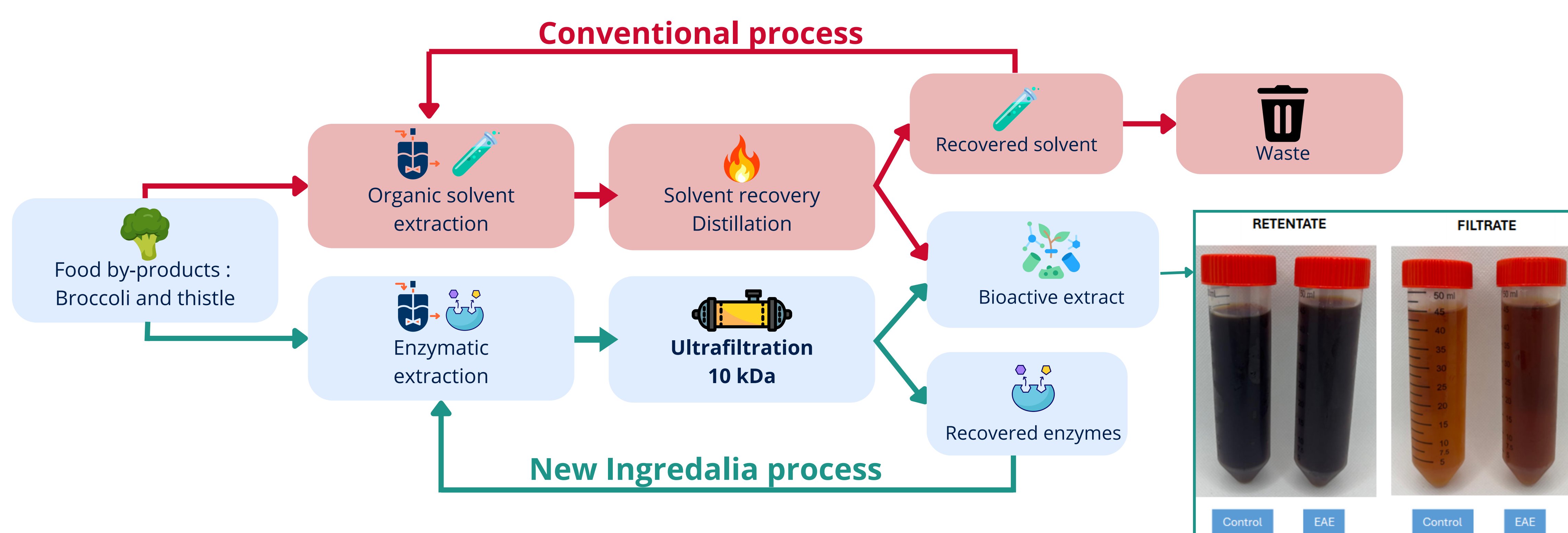
- Screening and optimisation of enzymes and extraction conditions at laboratory scale
- Development of an ultrafiltration step to recover the enzyme
- Scale-up of the selected extraction processes to 50-L industrially relevant trials.

The process targeted glucosinolates and polyphenols, with the objective of reducing dependence on conventional organic-solvent extraction while improving the sustainability of Ingredalia's ingredient production processes.

THE CHALLENGE

Ingredalia's **conventional extraction processes** rely on organic solvents such as ethanol to recover valuable bioactive compounds, including glucosinolates, polyphenols, antioxidant compounds and proteins, from plant by-products. These processes can involve high operating costs, waste generation and solvent recovery steps, while also increasing the environmental footprint and overall complexity of production.

The company therefore aimed to develop a **greener extraction route** based on enzymes and membrane filtration, capable of releasing bioactive compounds from plant matrices while reducing solvent use. The process also needed to remain economically viable, scalable and compatible with the recovery of the enzyme for potential reuse.



Extraction samples from broccoli

RESULTS & IMPACT



Broccoli

Glucosinolates

- 33% improvement vs. control
- More diverse profile in EAE vs. control, favouring the release of several indolic glucosinolates such as glucobrassicin

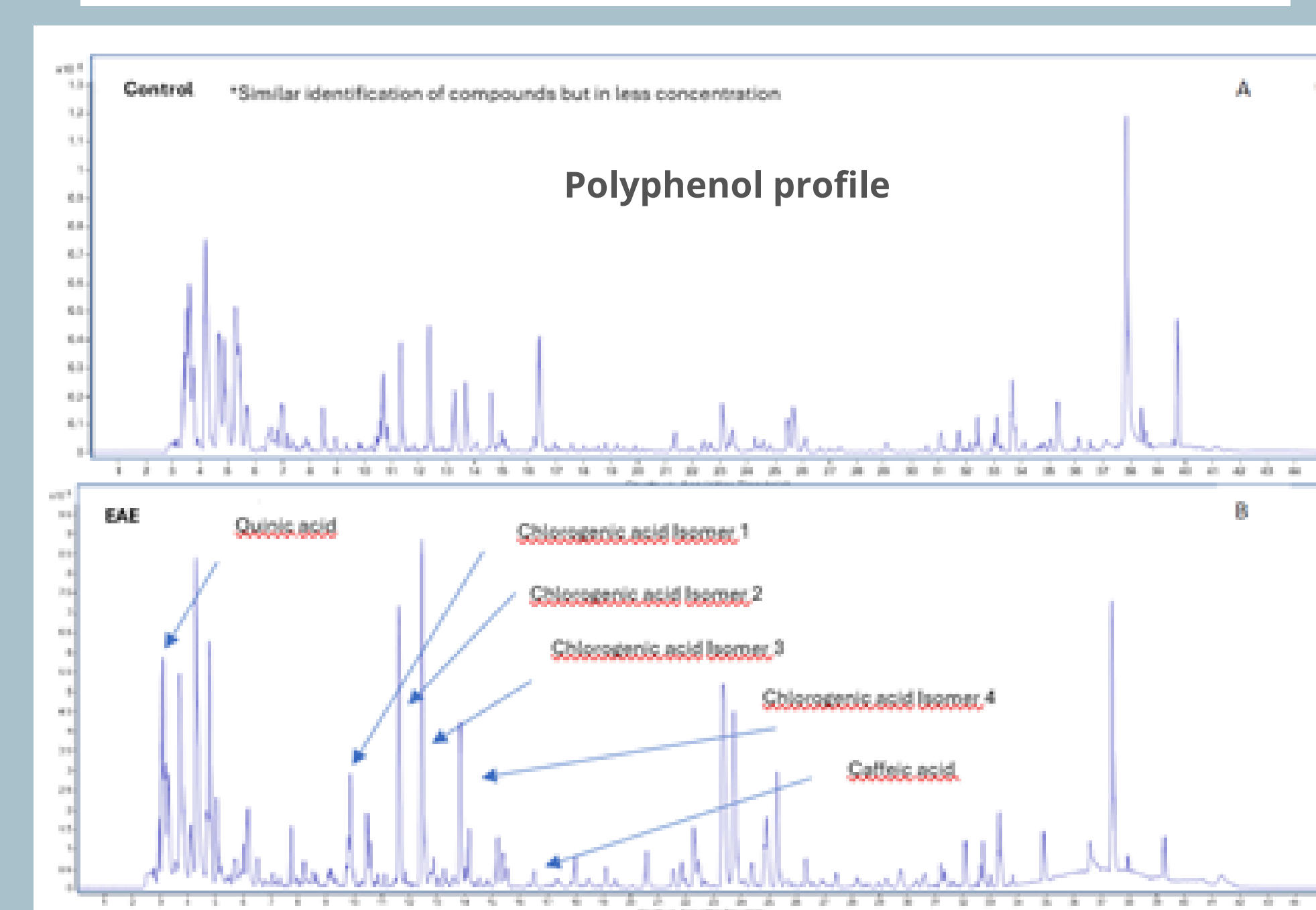
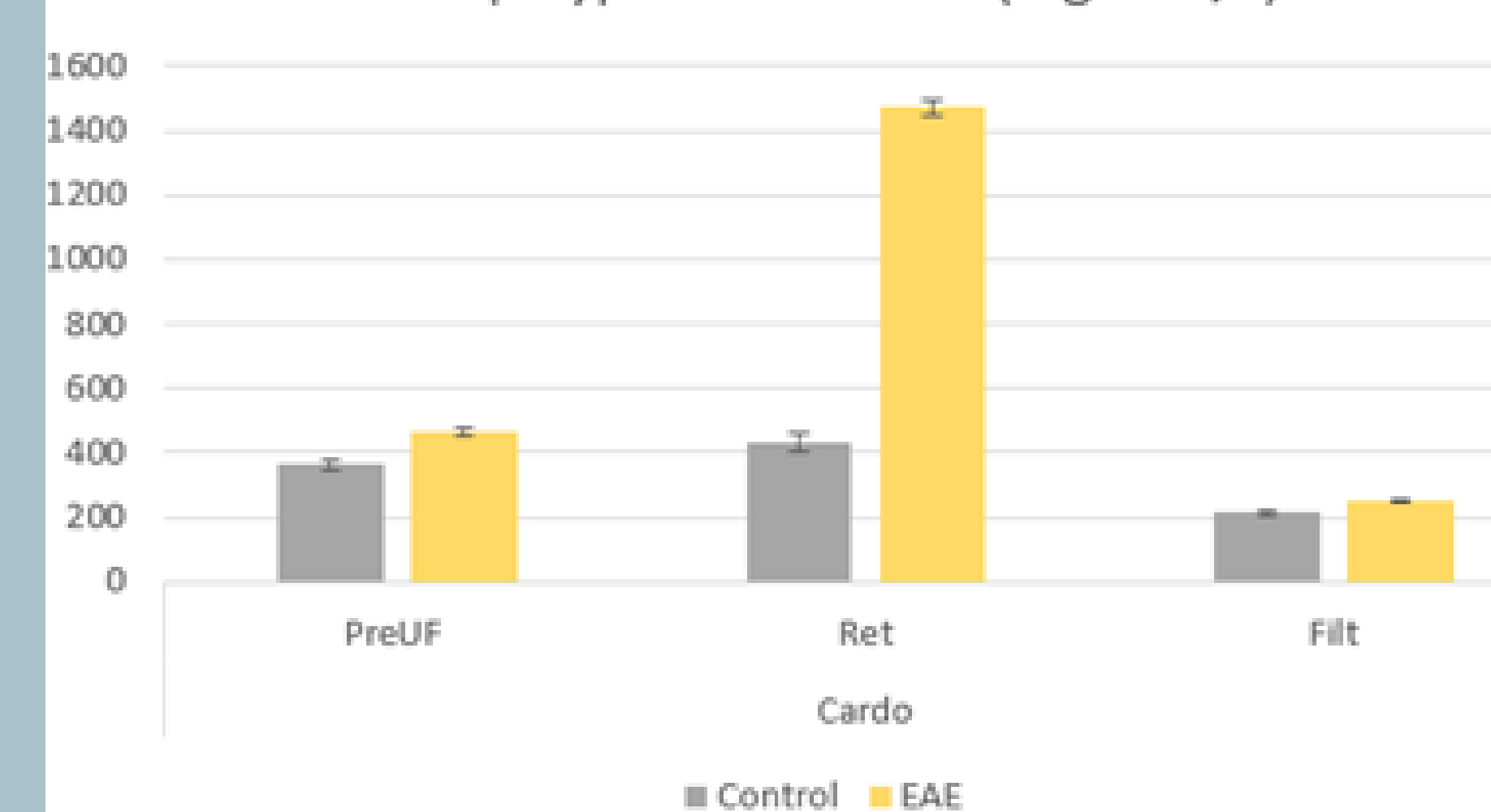


Thistle

Polyphenols

- 14% improvement vs. control
- Profile : stronger relative signals for chlorogenic acid and several dicaffeoylquinic acid derivatives
- Antioxidant activity : 15% improvement

Total polyphenol content (mg GAE/L)



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Ingredalia S.L.



Koukakis Farm

Thessaloniki, Greece

MyVeFir — Developing Fermented Plant-Based Alternatives to Kefir

ABOUT THE COMPANY

Koukakis Farm is one of the strongest milk and yoghurt manufacturers in Greece. The factory is located at Kilkis, in a completely natural environment.

The company produces premium products made exclusively from top quality fresh milk & ingredients.

THE CHALLENGE

Koukakis wanted to develop a plant-based alternative to traditional yoghurt while maintaining the sensory and nutritional qualities consumers expect from fermented beverages.

This required selecting a plant base compatible with fermentation, ensuring sufficient fermentable sugars, achieving the right texture, mouthfeel, flavour and aroma, maintaining probiotic viability and shelf life, and adapting the process to Koukakis Farm's industrial production line.

DESCRIPTION OF THE PROJECT

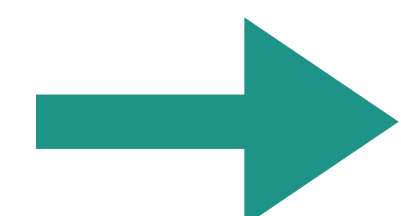
The project aimed to develop a new range of ready-to-drink fermented plant-based beverages using oat and rice bases, starter cultures, probiotic bacteria and enzymes.

The project covered several successive steps:

- Market and raw-material assessment, including the selection of the most suitable plant base.
- Formulation and fermentation optimisation, testing different cultures, processing conditions and functional ingredients.
- Nutritional, microbiological and sensory validation, including shelf life and probiotic viability.
- Industrial feasibility assessment, ensuring compatibility with existing production equipment and processes.
- Market positioning and innovation protection, including differentiated formulations for specific consumer groups and an IP strategy.

RESULTS & IMPACT

2 main plant bases assessed;
1 selected



Rice



Oat

- Superior stability during fermentation
- Naturally desirable texture
- Overall better sensory and functional properties

Functional and health promoting claims



Zink level



Polyphenol content



Antioxydent activity

Nutritional and microbiological stability

Consumer acceptance



Taste



Texture



Aroma



Appearance

TRL6



TRL8

Sustainability Impact

- Increased use of plant-based ingredients in fermented beverage production
- Preference for locally sourced ingredients, supporting regional supply chains
- Reduced transportation requirements
- Strengthened links with local producers and regional agricultural value chains

Exploitation of results

The results will support the industrialisation and future market launch of the MyVeFir product range, while the fermentation know-how and validated formulations can be further adapted to new plant-based functional beverages and consumer segments.



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🌐 Koukakis Farm S.A.



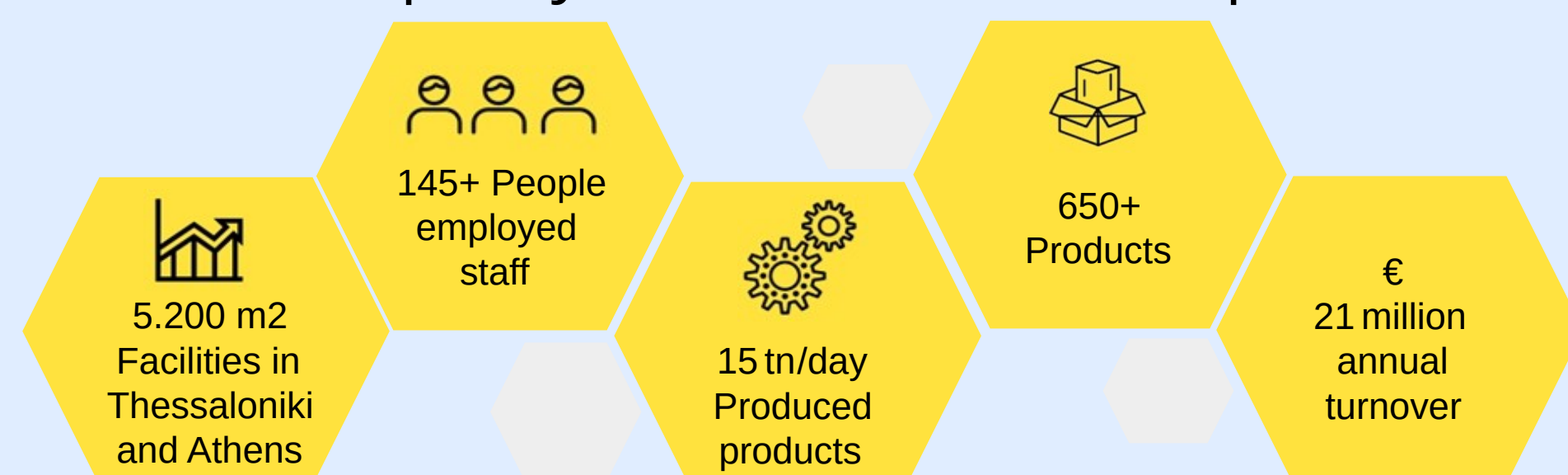
PROVIL S.A.

Thessaloniki, Greece

Microalgae derived EPS as a sustainable food additive

ABOUT THE COMPANY

PROVIL S.A. is a Greek company that produces **ingredients and supplements for the food industry**, mass catering, gastronomy and for meat retail business. For more than 25 years, PROVIL has been the trusted partner of both food production companies and professionals of gastronomy and organized catering in Greece and abroad, with our name being synonymous to know-how, quality, continuous development and reliability.



THE CHALLENGE

While food manufacturers rely heavily on conventional functional ingredients such as xanthan gum, carrageenan and pectin for texture and stability, there is growing demand for more sustainable alternatives. PROVIL therefore aimed to investigate whether **extracellular polymeric substances (EPS)** produced by microalgae could provide similar **technological functions** in food products. A key challenge was to use cheese whey efficiently as a cultivation medium, while ensuring robust microalgae growth, effective EPS recovery and solubility, and future regulatory acceptance.

Project description

The AlgaeEPS4Food project developed and evaluated **functional EPS produced by *D. tertiolecta* cultivated on a cheese whey-based medium**. It covered the full development pathway :

- Microalgae cultivation optimisation, testing different whey concentrations to maximise growth and EPS production.
- EPS isolation and characterisation using HPLC, GC-MS/FID and FT-IR.
- Functional-property assessment, including foaming, emulsification, water- and oil-holding capacity, flocculation and gelation.
- Food application testing in different formulations, including sauces, light mayonnaise, marinades and meat products.
- Sensory and consumer evaluation, including the use of whole microalgae biomass as a natural colouring ingredient.

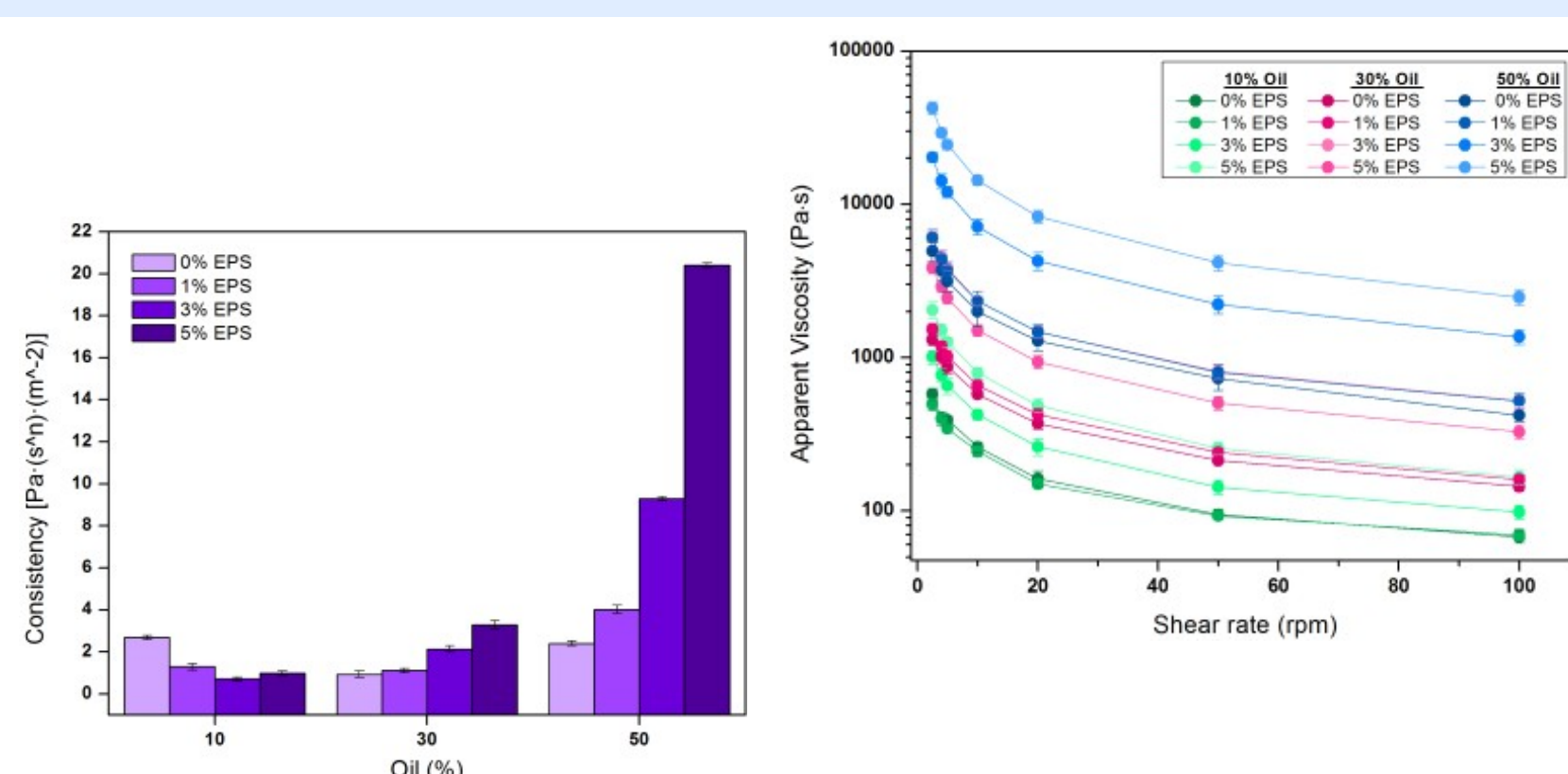
RESULTS & IMPACT

PROCESS OPTIMIZATION

Optimization of EPS final production was investigated by different conditions of microalgae *D. tertiolecta* cultivation & EPS isolation process.

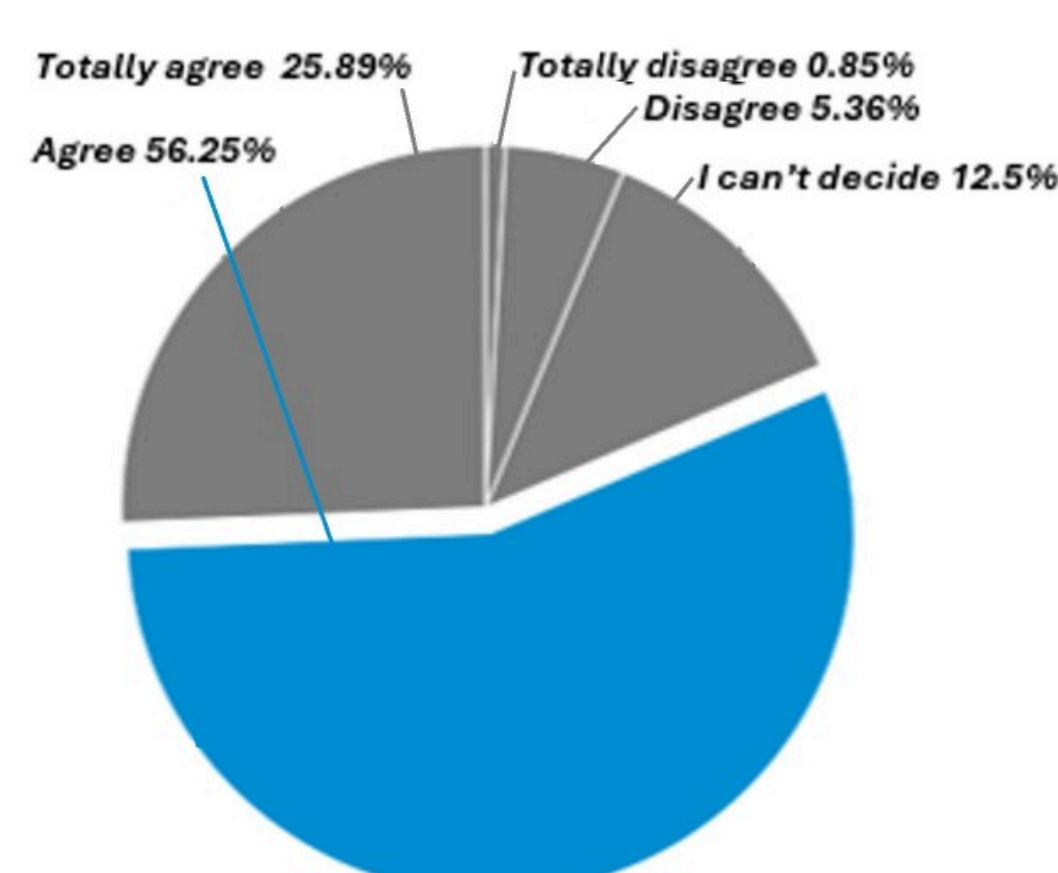
EMULSION TEXTURE

Emulsions exhibits non-Newtonian pseudoplastic behavior by presence of EPS. EPS enhanced the interactions within the continuous phase and promoted network formation around oil droplets. Result is a thicker and smooth texture with more consistency.



CONSUMER PERCEPTION

"Would you consume food that contains algae-derived ingredients instead of an additive, if you knew it had health benefits"



Microalgae

Cheese whey-based medium

Cultivation optimization

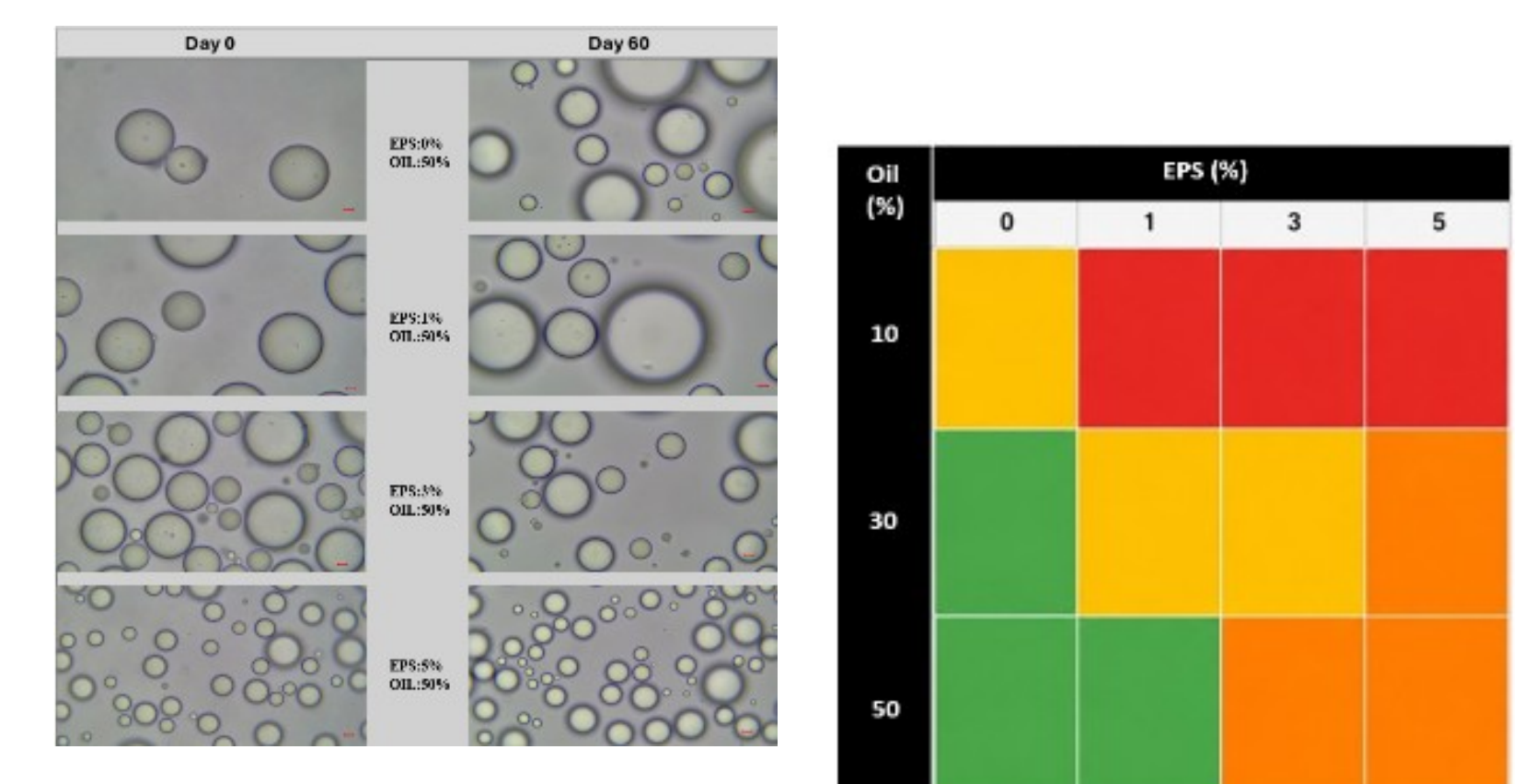
Extracellular Polymeric Substances production

EPS Isolation & Uses



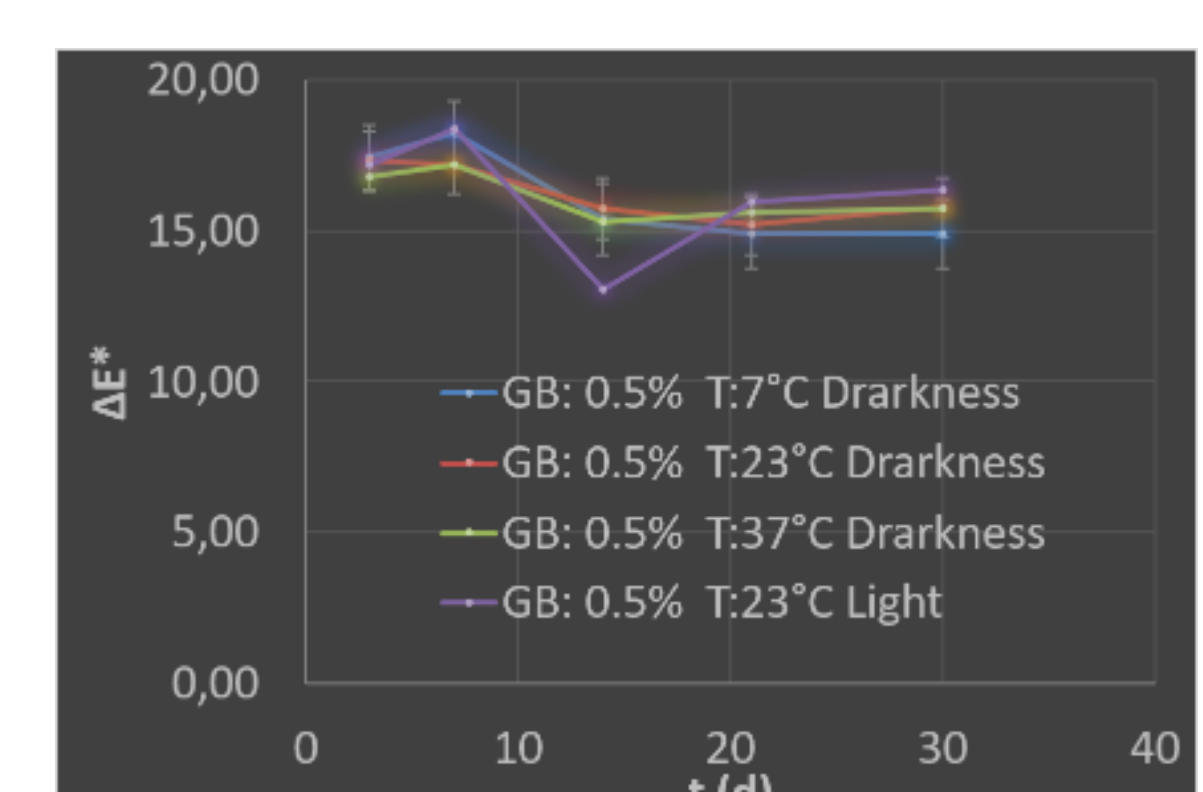
EMULSION STABILITY

The effect of the EPS is positive in emulsion stability regarding oil droplet size and **creaming effect**.



COLOUR STABILITY of GREEN BIOMAS (GB)

The mathematical difference in color (ΔE^*) between the initial and final storage time was studied under different storage conditions in a standard emulsion system and showed **good color stability and retention**.



KEY ACHIEVEMENTS

- Optimization of EPS production
- Optimization of final product characteristic
- TRL 7 reached

MARKET IMPACT

- Quantifying consumer acceptance of consuming Novel Foods and what would drive their decision.

SUSTAINABILITY IMPACT

- Use of whey as a nutrient for EPS production
- Total utilization of both the EPS and the microalgae green biomass (GB)



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in Provil S.A.



SADEF

Aspach-le-Bas, France

Avignon, France - Pôle Nutrition

A fermented ingredient to replace preservation additives for fresh-cut fruit and vegetables

ABOUT THE COMPANY

Heir to more than 70 years of know-how in agronomy, SADEF is now a reference laboratory for the analysis of agri and environmental expertise. To strengthen its research and innovation capacities, SADEF launched its Pole Nutrition in October 2024, integrating 4 senior R&D experts from an agri-food company with solid expertise in biotechnology. This new division develops natural solutions for healthier, more sustainable food, using fermentation, enzymology and biostatistics.

THE CHALLENGE

Potassium sorbate, the synthetic preservative widely used in fourth-range foods, is increasingly at odds with consumer and retailer **demand for clean-label products**. SADEF therefore sought to develop a natural, clean-label alternative delivering similar antimicrobial performance while preserving sensory quality.

A key requirement is to achieve a robust and industrially scalable process, despite variability in fermentation and stability issues such as extract oxidation. A first attempt to process pomegranate peel in-house ran into an oxidation problem, limiting SADEF's ability to produce a stable extract on its own.

DESCRIPTION OF THE PROJECT

The project aimed to **develop natural bio-preservative solutions** from food-industry byproducts, combined with biosourced organic acids. The two feedstock were grape pomace and pomegranate peel, both naturally rich in polyphenols and organic acids.

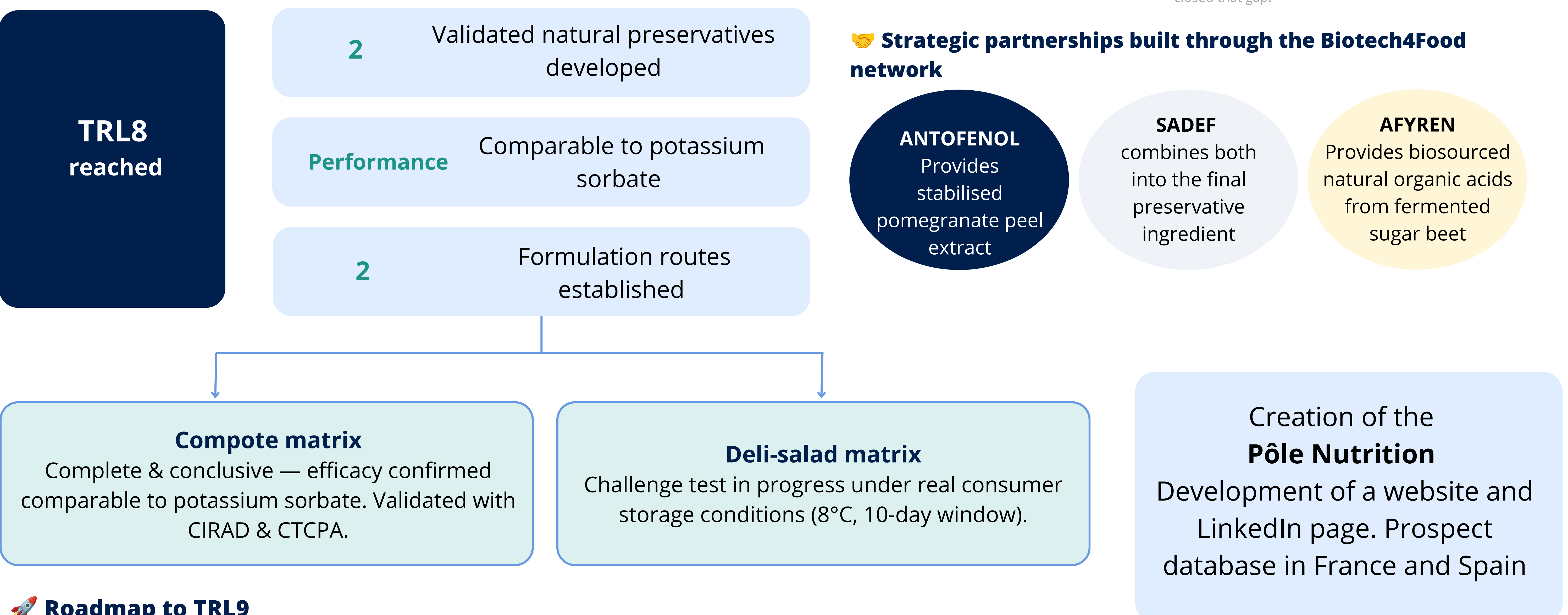
The project followed several key steps:

- Selection and optimisation of the extracts
- Formulation with fermentation-derived or biosourced organic acids
- Pilot-scale production and stabilisation
- Microbiological validation in model systems and real food matrices, including compote.

The ingredients formulation



RESULTS & IMPACT



Roadmap to TRL9



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 LinkedIn SADEF - Nutrition Hub



Superbiotics

Gembloux, Belgium

Developing a more efficient drying and microencapsulation process for probiotics

ABOUT THE COMPANY

Founded in 2019, Superbiotics' mission is to **develop innovative technologies** and **produce and formulate microbiotic solutions** comprising live probiotic strains. The company also aims to valorize and patent processes or strains that have demonstrated a significant impact on human and animal health. The identification of new physiological functionalities will enable the formulation of high value-added compounds.

THE CHALLENGE

Superbiotics currently relies on freeze-drying for the production of **encapsulated probiotics**. While effective, this process is relatively slow and energy intensive, creating limitations for future production capacity and competitiveness.

The company therefore sought to develop a **faster and less energy-intensive drying process** while maintaining probiotic viability and the protective properties of the encapsulation.

DESCRIPTION OF THE PROJECT

The project aimed to **integrate fluid-bed drying and granulation into Superbiotics' patented probiotic microencapsulation process** (Intelicaps) as a faster, less energy-intensive alternative to conventional freeze-drying.

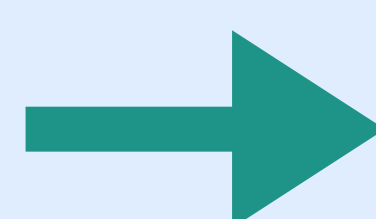
The project included :

- Selecting, installing and testing the more adequate fluid-bed drying equipment
- Optimizing key operating parameters such as temperature, airflow and formulation conditions. Different carrier and coating materials were then tested before validating the process with selected probiotic strains.
- testing the stability of dry samples testing
- Up-scale the process.



Installation of a fully operational **fluid-bed drying equipment**

TRL6



TRL9

A new **compressor** installed to support the process



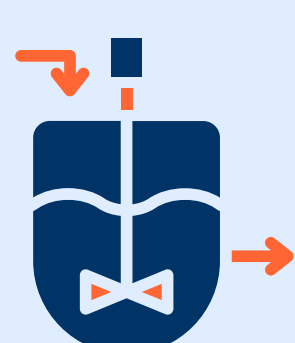
RESULTS & IMPACT



Fluid-bed parameters successfully optimised to obtain **free-flowing powders** without clumping



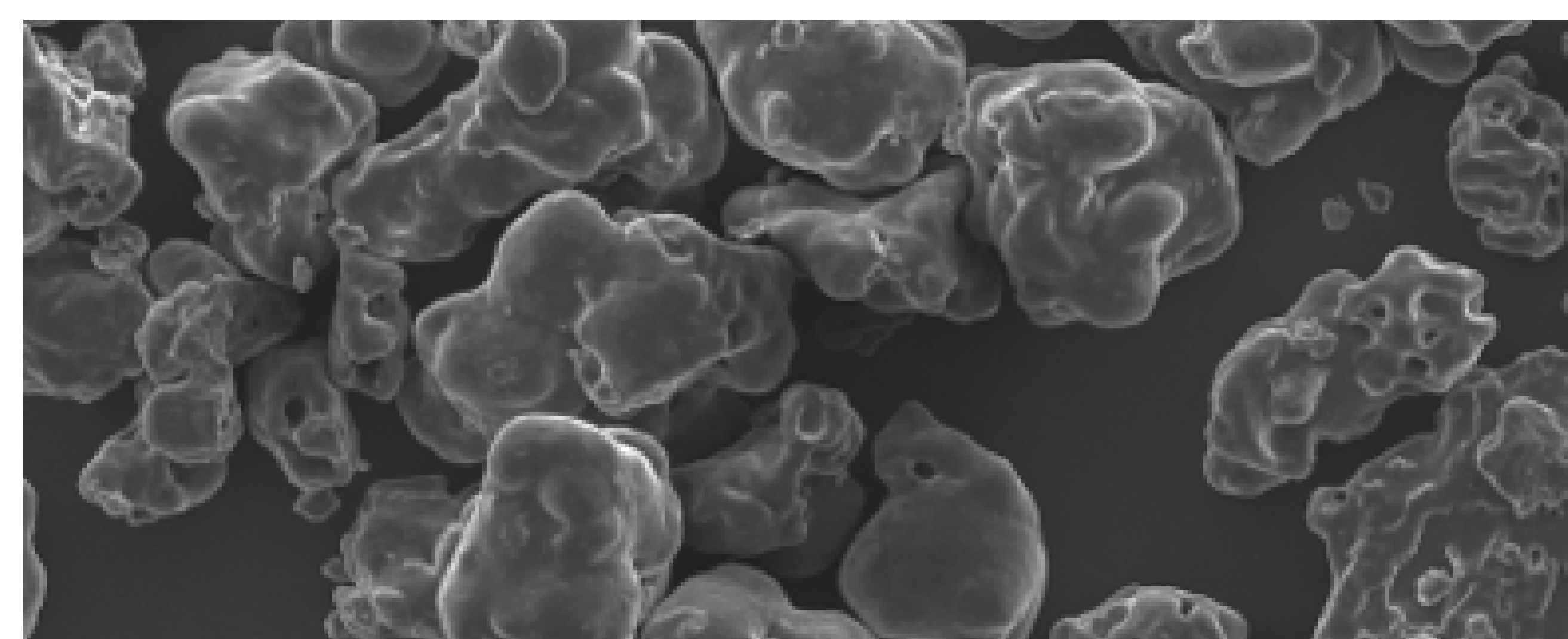
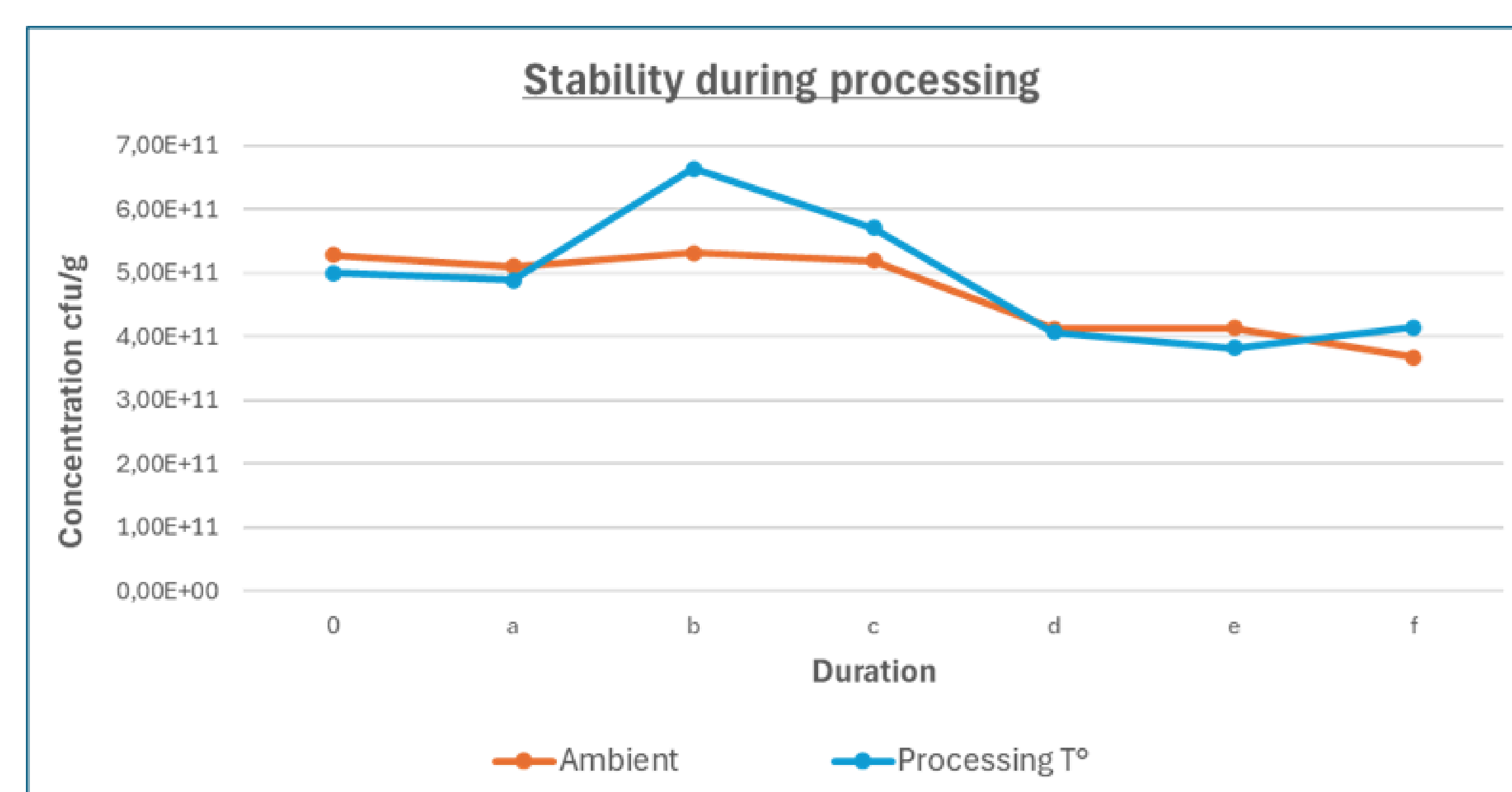
Hydrocolloid-based encapsulation successfully combined with fluid-bed processing



Successful trials with commercial probiotic bacteria (Bf. longum and Bf. an. lactis)



Cell concentrations after processing were in line with expected values compared to freeze-drying



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THT

Namur, Belgium

Turning fermentation supernatants into new functional products

ABOUT THE COMPANY

THT is a biotech company active in the production of **biotics via fermentation** for the food supplements (probiotics, postbiotics) and food (fermentation starters) markets. THT is particularly expert in the selection and production of lactic acid bacteria. THT differentiates from its competitors by the diversity of its various offer and its ability to adapt to customer demand. THT is part of the **Puratos Group**.

THE CHALLENGE

During THT's fermentation process, bacterial biomass is produced for use as probiotics, postbiotics, and fermentation starters. In addition, the process generates another high-value product: the **fermentation supernatant**. This supernatant contains extracellular metabolites with potential **health benefits**, but it is not yet valorised by THT. The project aimed to adapt THT's existing fermentation processes to **optimise the production** of both bacterial biomass and supernatants.

DESCRIPTION OF THE PROJECT

The project aimed to valorise fermentation supernatants by improving knowledge of the metabolites produced by THT's bacterial strains and adapting fermentation conditions to favour their production. The following approach was followed :

- Scientific literature allowed us to identify health-related metabolites and bacteria potentially able to produce them.
- Bioinformatics allowed us to learn about the metabolic pathways and the ability of our strains to produce the identified metabolites.
- Fermentation allowed us to grow our strains in several conditions and produce the identified metabolites.

RESULTS & IMPACT

BEFORE

No information on the content of our bacterial supernatants

AFTER

Identification and quantification of several health-related metabolites in our bacterial supernatants



TRL6
Project start



TRL8
Current status

8 Health-related metabolites identified

- Acetic acid
- Propionic acid
- Butyric acid
- Phenyllactic acid
- Indole-3-lactic acid
- Indole-3-acetic acid
- Urolithin A
- GABA



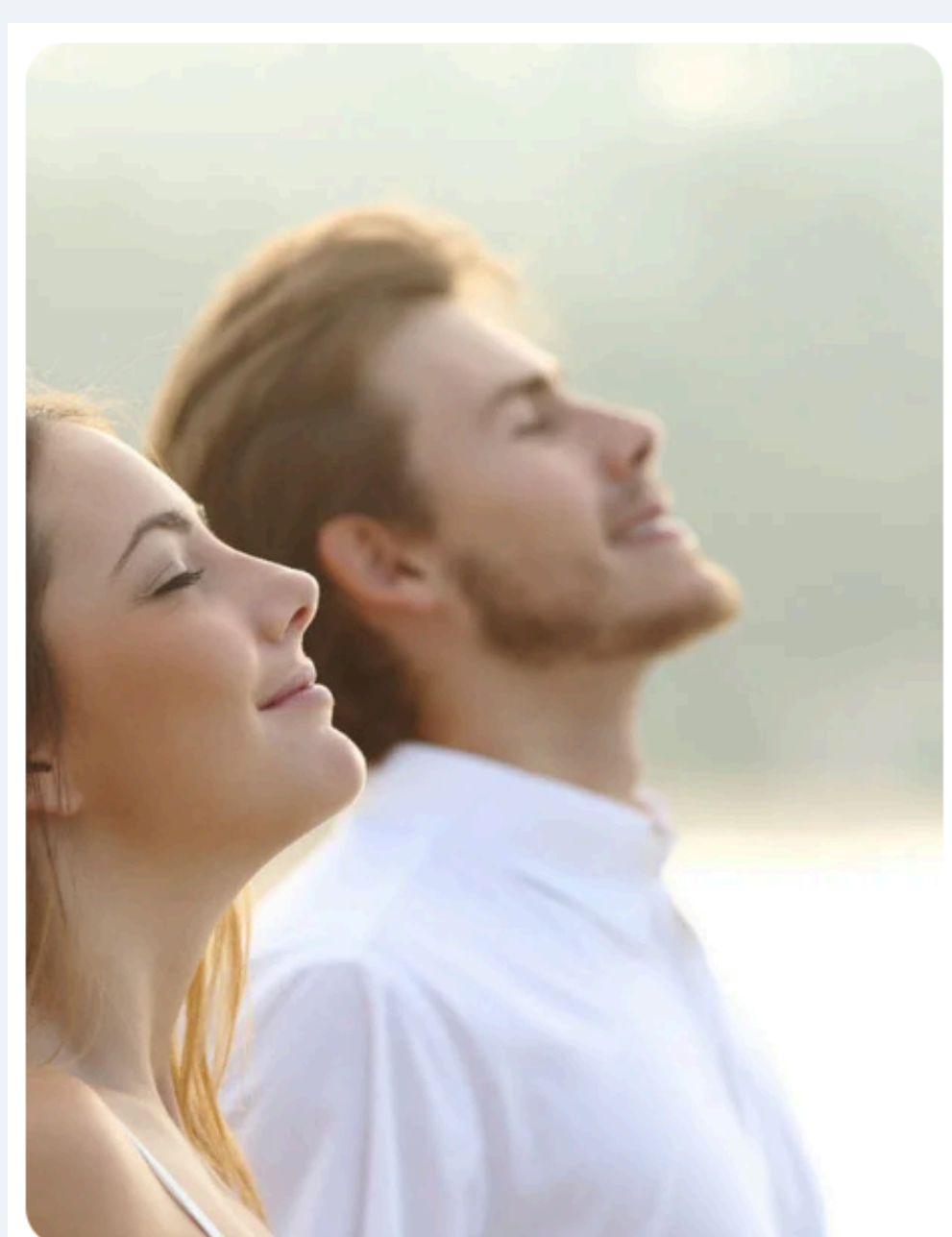
New probiotic formula

PROLACTYS®

HUMAN ESSENTIALS

PROLACTYS®
ADULT MOOD SUPPORT

THE GUT-BRAIN-AXIS
a full-blow wellness
category that can be improved
with the use of **tht-BIOTICS**



Feeling down or having the blues now and then is normal, and everyone feels anxious from time to time — it's a normal response to stressful situations. But severe or persistent feelings of depression and anxiety can be a sign of an underlying mental health disorder, and more and more people (adults and children) are experiencing discomfort associated with a mental disorder.

NUTRITIONAL BENEFITS OF

PROLACTYS®
HEALTHY AGEING SUPPORT

Boosting OUR HEALTHY AGEING

An elderly person is, in common usage, a person of advanced age who exhibits the physiological and social attributes of seniority as society imagines them; elderly people are also called seniors and elders.

There is no real consensus on the definition of an elderly person, and this definition varies depending on the institutions and the elements taken into consideration.

An older person is defined by the United Nations as someone who is over 60 years of age; however, families and communities often use other socio-cultural referents to define age, including family status (grandparents), physical appearance, or age-related health conditions (1). In France, an elderly person is generally defined as a person aged 60 and over, according to the World Health Organization (WHO) and French legislation on adapting society to ageing (RFAS-DREsante-gouv.fr); however, it is important to note that this definition can vary depending on the context (social, medical, etc.) and that ageing is a continuous and progressive process (2).



Lacking a consensual definition, in many instances the age at which a person becomes eligible for statutory and occupational retirement has become the default definition; the ages of 60 and 65 years are often used, despite their arbitrary nature, for which the origins and surrounding debates can be followed from the end of the 1800's through the mid-1900's (3,4,5). Vulnerability—more than an age—helps to better identify those who fall under the umbrella of geriatrics, and the onset of old age does not refer to any specific age, but to a state of functional incapacity experienced subjectively or objectively, according to the elderly themselves.



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 THT