

# What is the Smart Protein project?

8 October 2020, 11:00 - 12:00 CEST



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# Smart Protein for a Changing World: Ambition and strategies of the new Horizon 2020 research project

EMANUELE ZANNINI  
School of Food and Nutritional Sciences

# Smart Protein for a changing world

Alternative proteins for food and feed Call LC-SFS-17-2019



Horizon 2020 is the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years (2014 to 2020) aimed at securing Europe's global competitiveness.

One of the most **innovative** plant-based projects

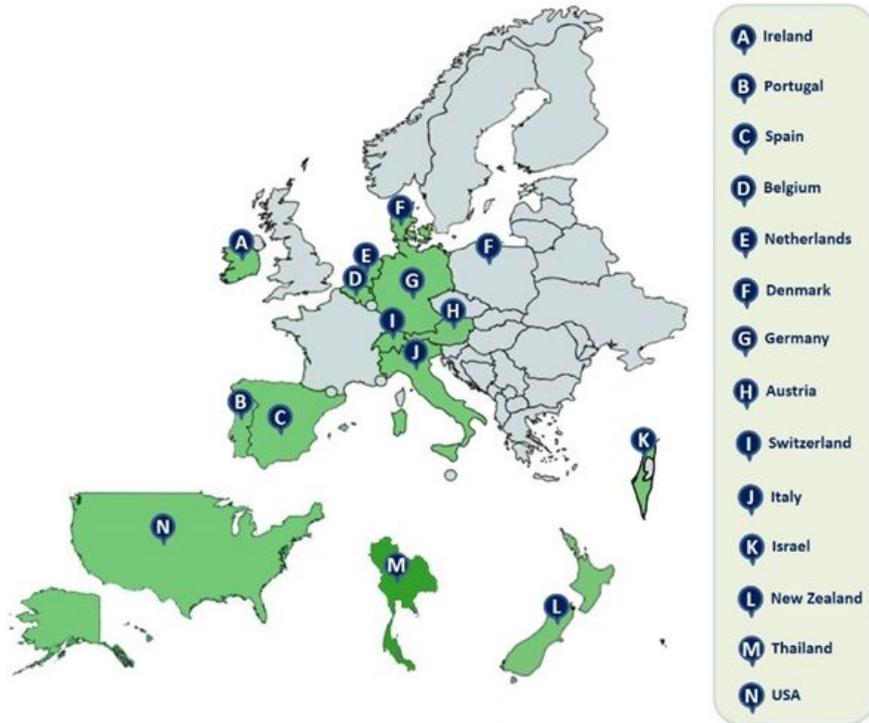
A collaboration of **33 partners** from more than **20 countries**



**4 years** in length  
(2020- 2024)

A **EU-funded research project** (Horizon 2020) with a €9+ million budget

# Consortium members



- A Ireland
- B Portugal
- C Spain
- D Belgium
- E Netherlands
- F Denmark
- G Germany
- H Austria
- I Switzerland
- J Italy
- K Israel
- L New Zealand
- M Thailand
- N USA

## 9 EU Member States

|         |          |       |         |             |         |         |         |       |
|---------|----------|-------|---------|-------------|---------|---------|---------|-------|
|         |          |       |         |             |         |         |         |       |
| Ireland | Portugal | Spain | Belgium | Netherlands | Denmark | Germany | Austria | Italy |
|         |          |       |         |             |         |         |         |       |
|         |          |       |         |             |         |         |         |       |
|         |          |       |         |             |         |         |         |       |
|         |          |       |         |             |         |         |         |       |
|         |          |       |         |             |         |         |         |       |
|         |          |       |         |             |         |         |         |       |

## 2 Associated Countries

|        |             |
|--------|-------------|
|        |             |
| Israel | Switzerland |
|        |             |

## 3 International Partners

|          |             |     |
|----------|-------------|-----|
|          |             |     |
| Thailand | New Zealand | USA |
|          |             |     |

# What they says about us...

Smart Protein for a Changing World.

**Smart Protein for a Changing World. Future-proof Alternative Terrestrial Protein Sources for Human Nutrition Encouraging Environment Regeneration, Processing Feasibility and Consumer Trust and Acceptability**

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 662957

SMART PROTEIN aims to industrially validate innovative, cost-effective and resource-efficient, EU-produced, healthy plant proteins and microbial biomass proteins for the production of ingredients and products for direct human consumption, through developing future-proofed protein supply chains with a positive impact on bio-economy, environment, biodiversity, human nutrition, food and nutrition security and consumer acceptance.



**vegconomist**  
- the vegan business magazine -

NEWS BY REGION | INTERVIEWS | PRODUCTS & LAUNCHES | COMPANIES & PORTRAITS | FOOD & BEVERAGE | MARKET & TRENDS | TRACES | FASHION & BEAUTY | SOCIETY | MARKETING & MEDIA | FAIR & EVENTS | MORE...

**EU Invests Almost €10M in Alt Protein in Response to Earth's "Urgent Challenges in Global Food Security"**

October 1, 2019 | 11:11 AM | The Vegan Press, Politics, Society

**Glania teams up with UCC on €10m vegan research programme**

Farming Independent - Contact us  
The Farming Independent brings together the experience...



**Forestry Investments**

Massive Growth Potential, 38% ROI in 12 months. Free Forestry Investment Report.

The Eco-Alliance

**Smart Protein: Barilla, AB InBev, Thai Union et al. collaborate on EU-funded novel protein project**

By Flora Scallan | 18 Oct 2019 | Last updated on 28 Oct 2019 at 11:07 GMT

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**Europe backs Smart Protein project in plant-based food innovation**

By Simon Harvey | 1 October 2019

Font size | Email | Print

An initiative under the European Commission's Horizon 2020 innovation programme will be launched next year to foster development in plant-based foods.

The Smart Protein project is being led by the School of Food and Nutritional Sciences at University College Cork, Ireland. The Commission is providing EUR8.2m (US\$8.9m) of the total EUR9.6m in funding to support innovation in "new protein foods made from plants, fungi, by-products, and residues", according to a statement.

Smart Protein will run for four years from 1 January with the first products - plant-based meats, fish, seafood, cheese, infant formula, other dairy products and baked goods - expected to be launched onto the market in 2025.

"A primary aim of the project is to help build a future-proof protein supply by creating sustainable and nutritious alternative proteins," the statement read. "This is in direct response to some of the most urgent challenges faced by the planet, including



Product roll out from Smart Protein expected in 2025



**Alternative protein project receives funding from EU**

Published by Emma Joyce on 1 October 2019

...from the European Union resulting in a state budget of ...

...to support the growing ...

...on 2020 Smart Protein (2020), ...

...Development (which installed ...

...the ...

# The aim is....

..to industrially validate innovative, cost-effective and resource-efficient, EU-produced plant proteins from...



Chickpeas, lentils,  
quinoa, fava beans

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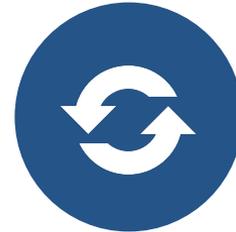
***Innovative protein***  
*products from plants*



Yeast and fungi

---

***New protein***  
*ingredients*



Byproducts from  
pasta, bread, beer

---

***A circular economy will***  
*be created by upcycling*  
*side streams*

# Why Smart Protein?

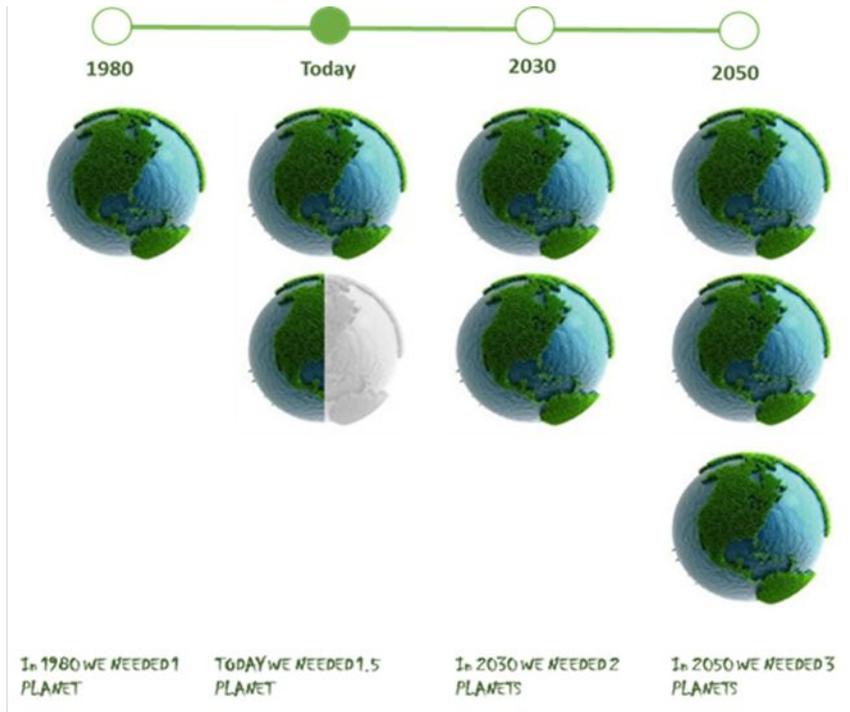
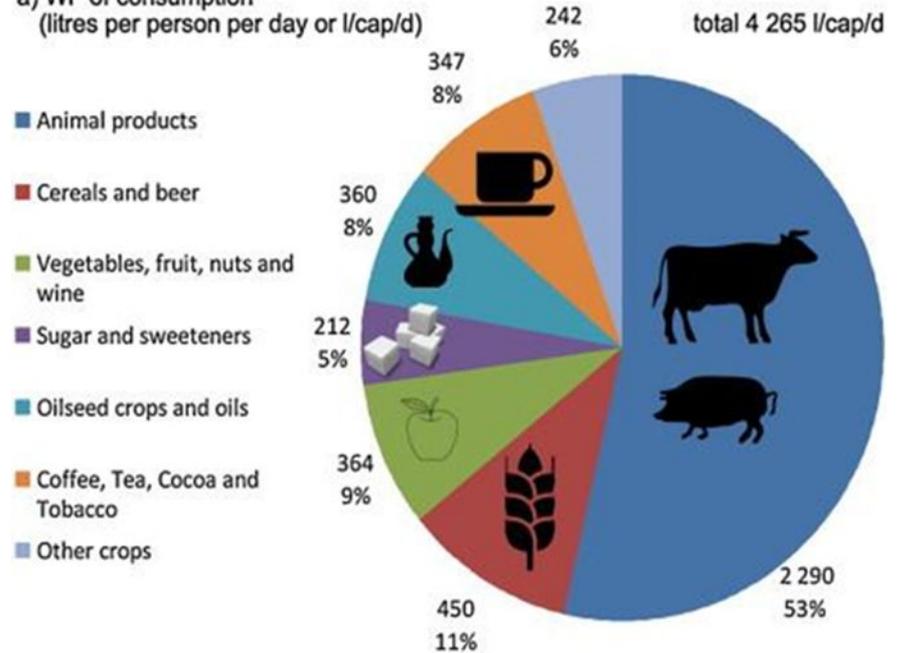


Figure 1.1 Over-exploitation and rising consumption means that by 2050 we will need 3 planets' worth of natural resources

## a) WF of consumption (litres per person per day or l/cap/d)

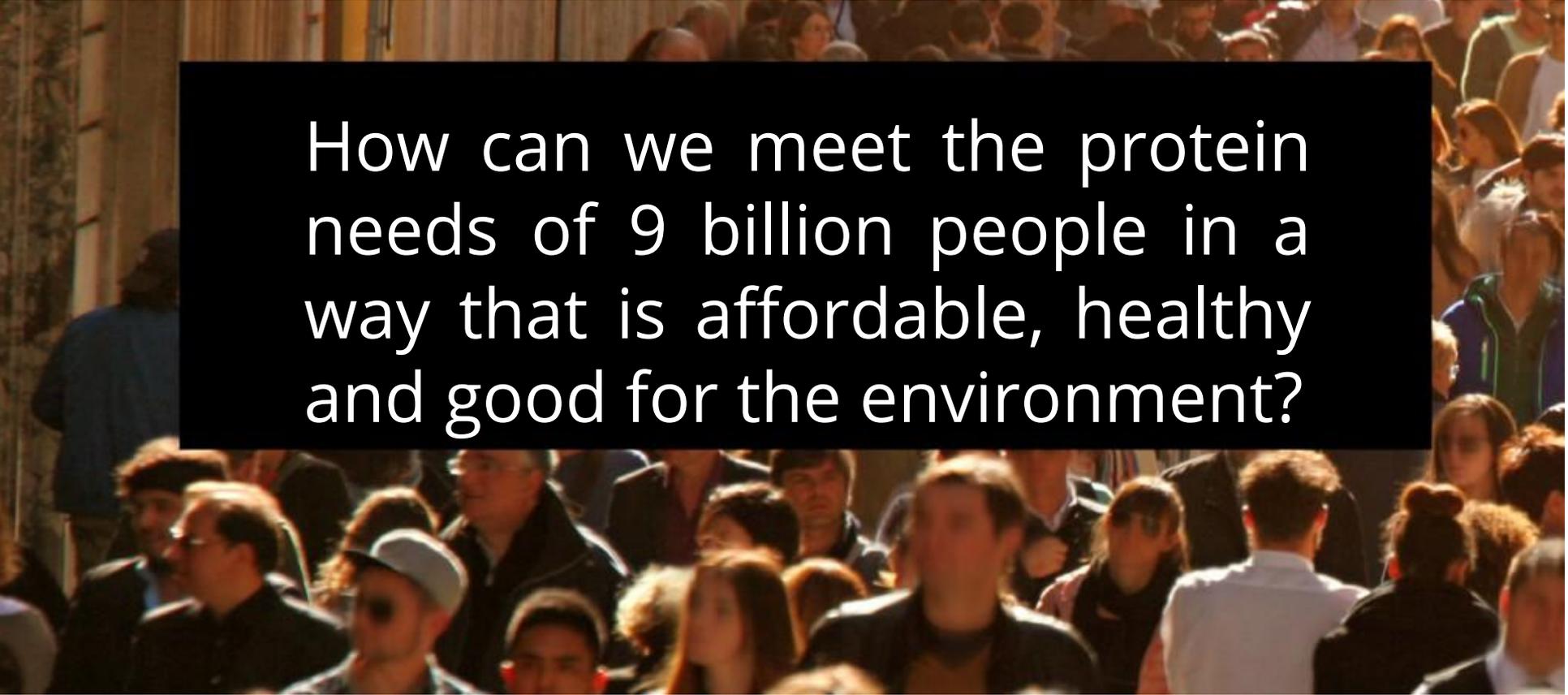


Water footprint (WF) of different products in EU (in l/cap/d) (Vanham and Bidoglio, 2013).

# Why Smart Protein?



How can we meet the protein needs of 9 billion people in a way that is affordable, healthy and good for the environment?



# Key trends in plant-based food products



## PLANT-BASED

**A fundamental shift in how people look at their plates.**

It's not about replacing meat, it's about broadening the healthy eating repertoire.

### Consumer motivations for eating more plants

Have more protein for health

Add variety & novelty

Eat more vegetables for health

Avoid/reduce dairy and/or sugar

Avoid/reduce meat

Support weight wellness



PROTEIN

## PROTEIN

Protein is here to stay, led by active sports-oriented people. Getting more protein is a priority for many consumers - although they're not so aware of quality.

**IT'S NOT ABOUT PLANT VS ANIMAL PROTEIN. THERE'S A GROWING MARKET FOR BOTH!**

**Consumers want**

✓ **NATURAL SOURCES OF PROTEIN**

✓ **VERSATILE & CONVENIENT PRODUCTS**



# Hybrid approach to vegetables?



Fazer, the Nordic bakery group, which has found a way to offer bread with a 30% vegetable content.

Despite all the talk, for most people, plant based isn't about entirely replacing the meat or dairy in their diet. What they want to do is simply get a few more vegetables into their daily diet.

Many would readily accept a "plantified" version of their usual fare – like these sausages from UK company MOR, which mix the meat with vegetables including spinach, peas and lentils, or Fazer's bread with 1/3 vegetable content including beetroot, carrot, parsnip and beans. The bread carries the on-pack message "The mix of root vegetables and beans makes the bread a source of protein and fibre."

Just as with hybrid cars, the format is familiar – but the consumer can feel better about their choice (as long as the product still tastes good).

## Pork, Super Green Veg & Lentil Sausages

Don't be fooled by these seemingly unassuming pork sausages: the combination of the green vegetables and peppery lentils is set off with a subtle hint of sweet chili.

### What's in them?

British pork, asparagus, peas, sweet chili, green lentils, onion and coriander (added in a sweet chili dressing).



"Plantified" version of meat-based products. UK company MOR, which mix the meat with vegetables including spinach, peas and lentils,

## Moroccan Spiced Pork, Cauliflower & Chickpea Sausages

Chickpeas and cauliflower perfectly complement the texture of the pork, while aromatic coriander and spicy harissa paste make every sausage sing.

More info





# Are we on the right track?

**CHART 17: WHO IS BACKING THE MEAT SUBSTITUTE COMPANIES**

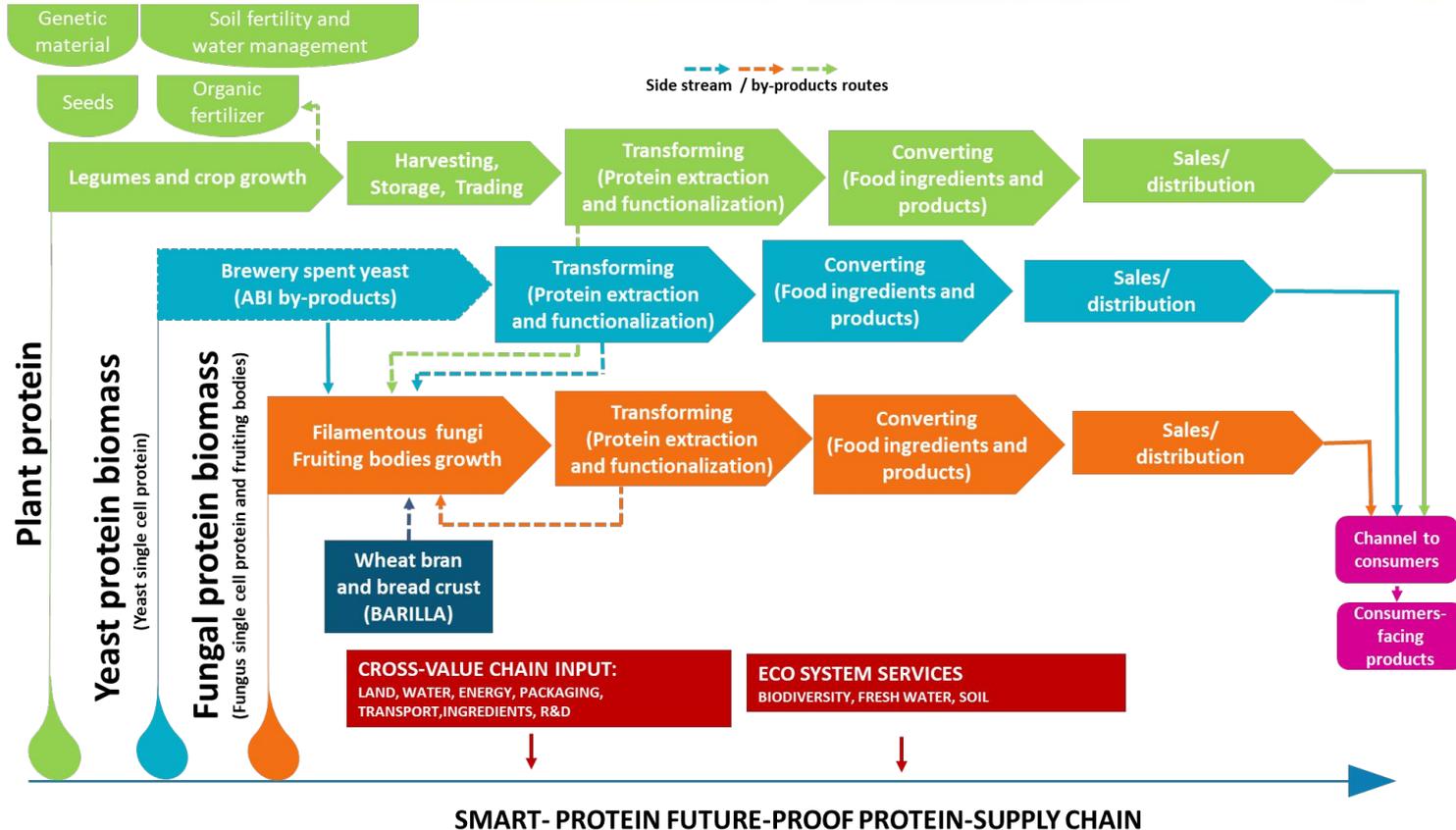
| COMPANY           | INVESTORS INCLUDE  |
|-------------------|--|
| Impossible Foods  | Google Ventures, Khosla Ventures, Bill Gates, Horizon Ventures, Facebook co-founder Dustin Moskovitz's Open Philanthropy Project               |
| Beyond Meat       | Obvious Corporation (founded by Twitter co-founders), Bill Gates, Kleiner Perkins (a Silicon Valley venture capital firm), General Mills Tyson |
| Memphis Meats     | Bill Gates, Richard Branson, Cargill   |
| Mosa Meat         | Development of lab-grown meat as proof of concept backed Google co-founder Sergey Brin   |
| Sweet Earth       | Nestle   |
| Pulled Oats       | Paulig   |
| Gardein           | Pinnacle Foods   |
| Morningstar Farms | Kellogg  |
| Gardenburger      | Kellogg  |
| Boca Burger       | Kraft  |
| Quorn             | Monde Nissin   |

| <b>Nutrition Facts</b>            |                       |
|-----------------------------------|-----------------------|
| Serving Size 1 Patty, 4 oz (113g) |                       |
| Servings Per Container: 2         |                       |
| Amount Per Serving                |                       |
| <b>Calories</b> 250               | Calories from Fat 160 |
| % Daily Value*                    |                       |
| <b>Total Fat</b> 18g              | <b>28%</b>            |
| Saturated Fat 6g                  | <b>30%</b>            |
| Trans Fat 0g                      |                       |
| <b>Cholesterol</b> 0mg            | <b>0%</b>             |
| <b>Sodium</b> 390mg               | <b>16%</b>            |
| <b>Potassium</b> 300 mg           | <b>6%</b>             |
| <b>Total Carbohydrate</b> 3g      | <b>1%</b>             |
| Dietary Fiber 2g                  | <b>8%</b>             |
| Sugars 0g                         |                       |
| <b>Protein</b> 20g                | <b>40%</b>            |
| Vitamin A                         | <b>0%</b>             |
| Vitamin C                         | <b>0%</b>             |
| Calcium                           | <b>8%</b>             |
| Iron                              | <b>25%</b>            |

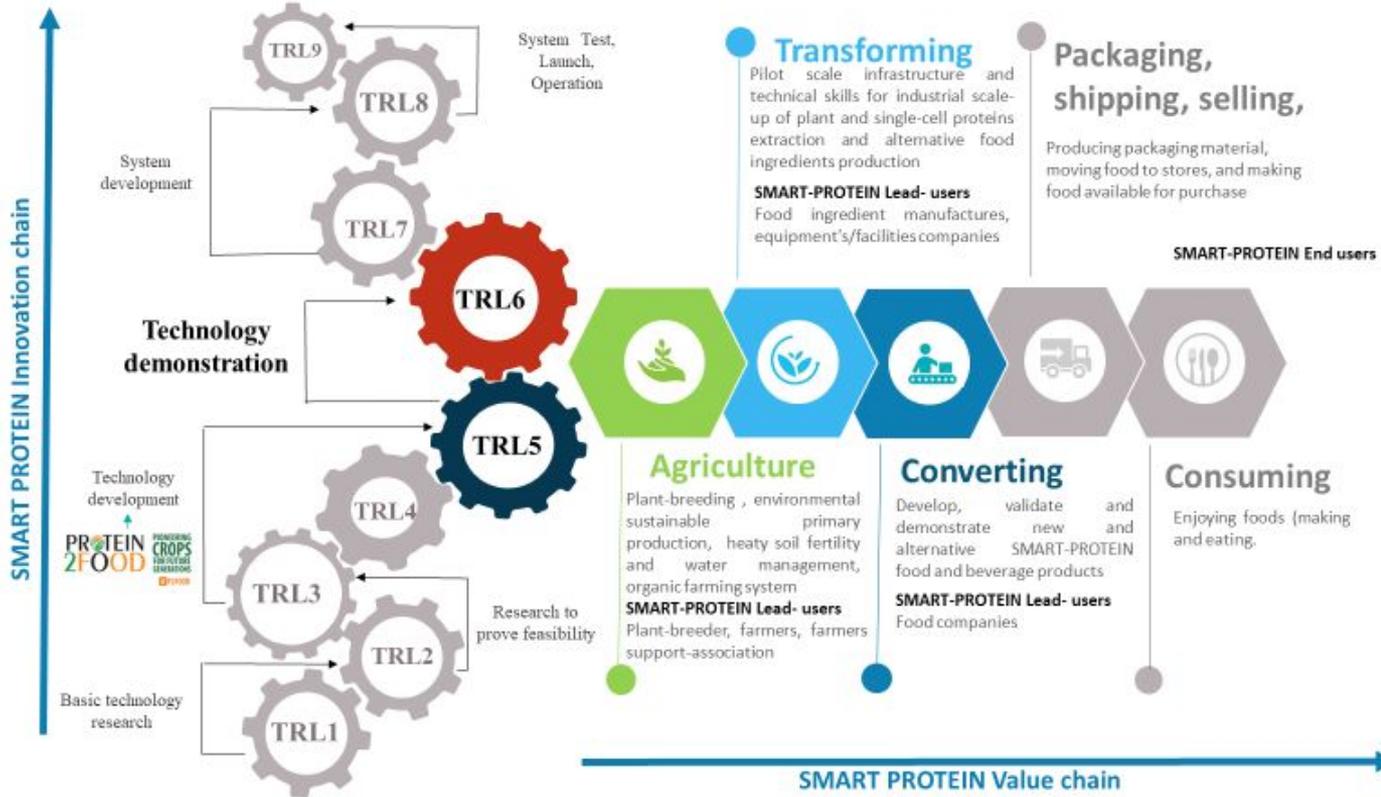
\*Percent Daily Values are based on a 2,000 calorie diet

**INGREDIENTS:** Water, Pea Protein Isolate\*, Expeller-pressed Canola Oil, Refined Coconut Oil, Rice Protein, Natural Flavors, Cocoa Butter, Mung Bean Protein, Methylcellulose, Potato Starch, Apple Extract, Salt, Potassium Chloride, Vinegar, Lemon Juice Concentrate, Sunflower Lecithin, Pomegranate Fruit Powder, Beet Juice Extract (for color).

# Protein sources investigated



# The value and innovation chain



# Smart Protein project strategy

## WP4 – Food nutrition and health

**Objectives:** Optimisation of the nutritional and biological profile of the SMART food ingredients/foods/beverages plant based products prototyped via human intervention studies. **Key players:** Food and beverage industries

## WP3 – Food processing

**Objectives:** Protein-protein interaction, protein functionality, Development of food ingredients/foods/beverages plant based products. Formulate protein combinations for partial or full substitution of protein sources traditional utilised. Industrial validation and demonstration of developed food and beverage prototypes

**Key players:** Food and beverage industries

## WP2 - Plant protein processing and side stream up-cycling

**Objectives:** Protein extraction validation at the industrial environment, up-cycling side-stream products generates from SMART partners, mycelium, mushroom protein production

**Key players:** Food and beverage ingredients companies

## WP1 - Protein crop, soil and water management

**Objectives:** Water management, - Soil fertility protection, -Protein crops validation and production strengthening.

**Key players:** Farmers, farmers support associations, plant breeders

## WP5 –Exploitation & business development

**Objectives:** Assessment of the commercial feasibility and safety of protein channels through its live interaction among the WP1-WP4 – Business case-development

**Key players:** Farmers/Industries/ Food retailers, Consumers/support, associations

## WP6 –Consumer studies

**Objectives:** Development and implementation of plant-based food and beverage prototypes to enhance consumer's acceptance, Consumer readiness, Network and promoting activities

**Key players:** Food retailers, consumers/support associations

## WP7 – Dissemination and communication

**Objectives:** disseminate, exploit and communicate the results of the SMART-PROTEIN within and outside the consortium to the public and relevant professional sectors such as food industry, manufacturing and production, food and regulatory authorities.

**Key players:** Farmers/Industries/ Food retailers, Consumers/support, associations, policy makers

## WP8 – Sustainability Assessment

**Objectives:** Environmental impact profiles of protein food covering the whole protein food supply chain (from cradle to grave)

**Key players:** Farmers/Industries/ Food retailers, Consumers/support, associations, policy makers

## WP9 – Project management and coordination

**Objectives:** Overall management of the project, establishment of an effective communication infrastructure and foster the integrative process within the consortium, ensure consortium's performance.

# The expected outcomes

## Agriculture

- Suitable legumes and protein-crop varieties for the different EU pedo-climatic areas investigated
- Optimised SOP for organic production and for healthy soil and rational water and fertility management
- Data collection for supporting the smart-protein LCA investigation



## Transforming

- Production of high quality plant protein ingredients accomplished on industrial scale
- Optimised combination of side streams and fungal strain for fungal fermentation
- Optimized procedures for mycelium production by LSF
- Optimized procedures for mycelium cake and mushroom production by SSF



## Converting

- High premium quality proteins for food from plant and single-cell proteins
- New market opportunities for innovative SMART PROTEIN products,
- Future-proofed SMART PROTEIN protein supply chains
- Increased trust and consumer acceptability for SMART PROTEIN protein sources and processes.



# Q&A Session 1

EMANUELE ZANNINI  
School of Food and Nutritional Sciences

**#SmartProtein**



# What is the Smart Protein project?

## Insights from Chr. Hansen

Patrizia Buldo, PhD  
Chr. Hansen, Plant Based Application-Projects & Competences

# Contents

- Introduction to Chr. Hansen
- Market trends
- Why Smart Protein ?
- WP3: Food processing
  - AIM
  - Chr. Hansen contribution

# About us

- Chr. Hansen is a leading, global bioscience company.
- We develop natural ingredient solutions for the food, nutritional, pharmaceutical, and agricultural industries.
- We develop and produce cultures, enzymes, and probiotics.
- Our product innovation is based on approximately 40,000 microbial strains – we like to refer to them as ‘good bacteria’.



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IN EXISTENCE FOR

**145**

YEARS



CUSTOMERS IN APPROX.

**140**

COUNTRIES



**ORGANIC  
GROWTH**

FY18/19

UP

**7%**



MORE THAN

**3,700**

EMPLOYEES



APPROX.

**40,000**

MICROBIAL  
STRAINS



TURNOVER FY18/19

**€1,161  
MILLION**

**EBIT MARGIN**

FY18/19

**29.6%**

SUBSIDIARIES AND  
REPRESENTATIVE OFFICES IN

**30**

COUNTRIES

**STRONG R&D  
PLATFORM**



**7%**

OF TURNOVER



**17%**

OF EMPLOYEES



MANUFACTURING PLANTS ON

**4**

CONTINENTS

**REGIONAL REVENUE**

FY18/19

APAC **17%**

EMEA **44%**

LATAM **12%**

NORTH AMERICA **27%**



EVERY

**2nd**

CHEESE AND  
YOGURT IN THE  
WORLD ARE MADE  
WITH CHR. HANSEN  
INGREDIENTS



**MOST  
SUSTAINABLE  
COMPANY IN THE WORLD  
2019**

BY CORPORATE KNIGHTS

**300+**

ACADEMIC  
PARTNERSHIPS  
AND  
REPRESENTED IN

**30+**

SCIENTIFIC  
ASSOCIATIONS,  
ADVISORY  
BOARDS, ETC



**1 BILLION**

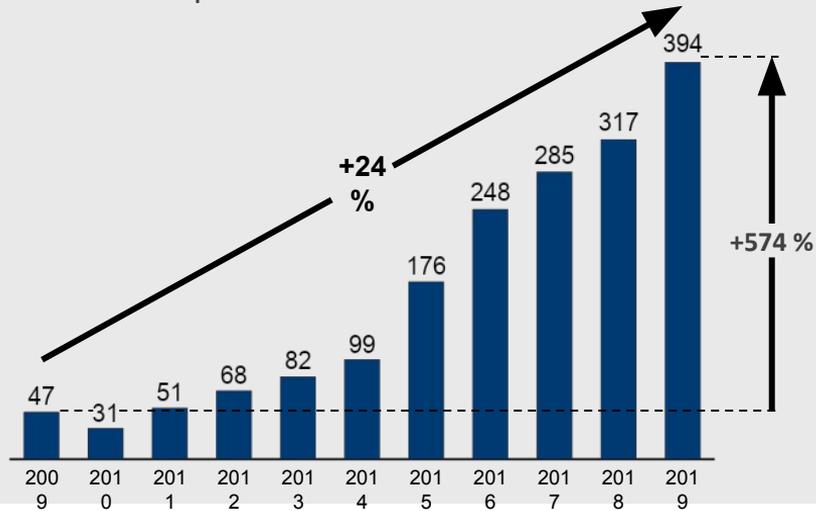
NUMBER OF PEOPLE THAT  
CONSUME A PRODUCT  
WITH A CHR. HANSEN  
INGREDIENT EVERY DAY

# Launches of fermented plant-based yogurts continues to accelerate

MINTEL

## MARKET LAUNCH

Fermented Dairy Alternatives worldwide from 2009-2019  
Amount of products



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# We see five global consumer value drivers



The pursuit of real food is a constant negotiation among the five values, and solving difficult dilemmas is key.

# Why Smart Protein?

Dissemination & communication



Diversified partners

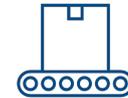


Protein crop production;  
regenerative farming

Sustainability assessment

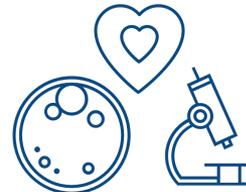


Prototypes



Plant Protein processing

Consumer studies



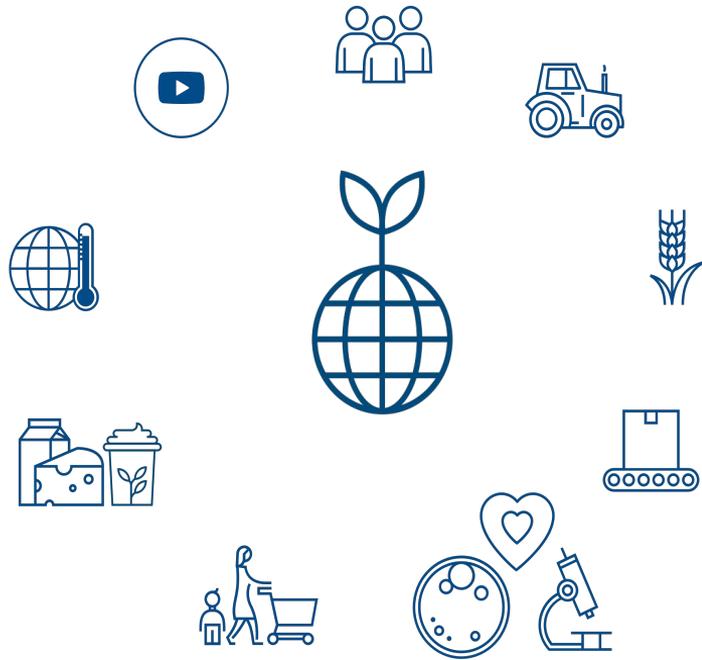
Fundamental research

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# Why Smart Protein?

Company mission goals are highlighted by the consortium goals



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# Work Package 3: Food processing



## AIM:

- Develop **high quality, nutritious, sensory enhanced, safe, sustainable and healthy** alternative based protein **food prototypes**, validated at a pre-commercial scale environment through efficient production and processing approaches.
- Comprehensive investigation of **protein-protein** and **protein-polysaccharide interactions** and **micro-structural development** in **complex food systems tailoring**, thus, the (re)formulations of protein blends for the **next generation of foods**.

# Work Package 3: Food processing



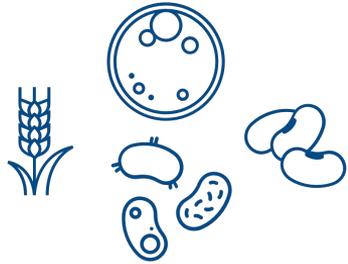
## Partners:

- University of Bolzan
- University College Cork
- Soguima
- Coposa
- Nutricia
- University of Copenhagen
- Chr. Hansen
- Novozymes
- Fraunhofer
- Dohler
- Woerle
- Mogu
- Barilla
- Arca
- Thai Union Global Innovation Group
- Agresearch Limited

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# Contribution and opportunities



## INNOVATE BEYOND THE ESTABLISHED PLANT PROTEINS

Understand and characterize the performance of Chr. Hansen commercial cultures, including probiotics, in fava bean, chickpea, lentil and quinoa bases.

## FOCUS ON CONSUMERS' EXPECTATIONS

Explore novel flavors and textural properties with fermentation.

## “GROW A BETTER WORLD. NATURALLY”

Innovate the market by Chr. Hansen innovative fermentation solutions.

**CHR. HANSEN**

*Improving food & health*

# Contact us



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# Q&A Session 2



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Senior Research Coordinator  
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the University College Cork



**Dr Patrizia Buldo**  
Senior Application  
Scientist at  
Chr. Hansen



**#SmartProtein**

We are working with FI Europe CONNECT  
as a media partner for the delivery of this event.



# What does the consumer want?

15 October 2020, 11:00 – 12:15 CEST



**Dr Kai-Brit Bechtold**  
Senior Consumer Research Scientist  
at ProVeg International



**David Hedin**  
Consultant at  
Euromonitor International



**Chris Bryant**  
Director of Social Science  
at the Cellular Agriculture Society



**Nicolas Dhers**  
Strategic Director on Food  
Transition at Carrefour