# Welcome to
# Valio Food 2.0 annual seminar
# &
# Food RDI-forum kick-off

Paasitorni, Helsinki
March 19th, 2025

# Organizers

Valio

VTT

ETL

Luke

UNIVERSITY OF HELSINKI

# Supported by

Ministry of Agriculture and Forestry of Finland

BUSINESS FINLAND

# Program – Morning session: Finnish Food RDI forum kick off

10.00 **Opening**

10.10 **Introduction to Finnish Food RDI**

- Finnish food research and innovation strategy - Emilia Nordlund, VTT
- Roadmap for RDI in the Food Industry - Marleena Tanhuanpää, ETL
- Valio Food 2.0 in a nutshell - Riitta Partanen, Valio
- Government food strategy work - Mikko Peltonen, MMM
- Need for the national RDI forum - Anu Kaukovirta, Luke

10.45 **Co-creation for ways of working in the national Food RDI Forum**

- Interactive session with all attendees

11.15 **National PhD work pitching session** - chair: Mari Sandell, UH

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- Longitudinal transcriptomic analyses of food spoilage microbiomes, Julia Manninen, UH
- From microbes to mechanisms: Advancing gut health research with a dynamic multistage in vitro gastrointestinal model, Moona Partanen, UEF
- Health effects of oats as part of a low-gluten diet, Enni Mannila, UTU
- Something old, something new: Consumer interest in traditional and novel Baltic herring products, Nora Logrén, UTU

11.50 **Next steps for the Food RDI forum**

12.00-13.00 **Lunch with networking and exhibition**

# Introduction to Finnish Food RDI

# Finnish food research and innovation strategy

Emilia Nordlund, VTT

# Food Research and Innovation Strategy for Finland 2021-2035

**Co-work of several RDI organizations in Finland**:

- VTT: Nesli Sözer, Emilia Nordlund, Kaisa Poutanen, Maria Åkerman
- University of Helsinki: Marina Heinonen, Mari Sandell
- University of Eastern Finland: Marjukka Kolehmainen
- Finnish Food Authority: Liisa Maunuksela
- Luke: Johanna Vilkki
- Finnish Institute for Health and Welfare & University of Tampere: Suvi Virtanen
- University of Turku: Baoru Yang

## Four sub missions defined towards 2035

**1. Healthy, safe, and sustainable diets are viable for all Finnish citizens**

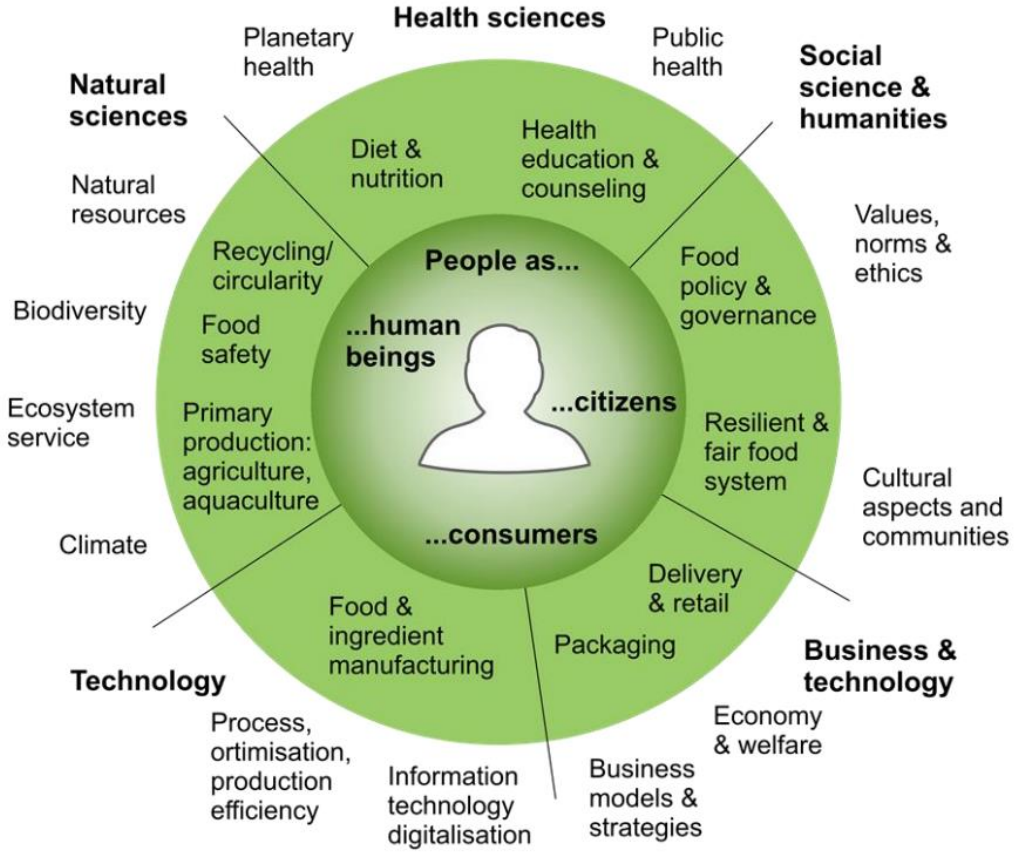
**2. Food and feed production in Finland is sustainable, competitive and resilient**

**3. Resource efficiency and zero waste are key determinants in the Finnish food system**

**4. Finland is a forerunner and leading testbed for sustainable food system innovations**

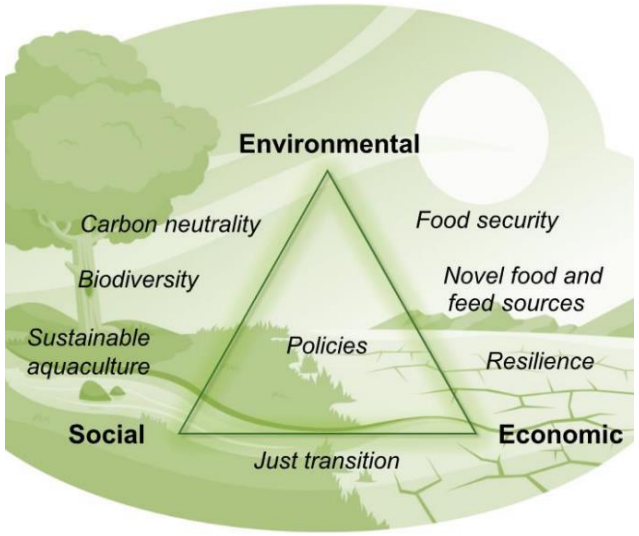
# Food Research and Innovation Strategy for Finland 2021-2035

Research perspectives for the food research strategy development were diverse




## 1. Healthy, safe, and sustainable diets are viable for all Finnish citizens

Levels environmental factors where individuals make the food and other lifestyle related choices.




## 2. Food and feed production in Finland is sustainable, competitive and resilient

The research priorities to combat challenges in sustainable food production.

## 3. Resource efficiency and zero waste are key determinants in the Finnish food system

Priority research areas to achieve resource efficiency and zero waste


## 4. Finland is a forerunner and leading testbed for sustainable food system innovations

Triangle of the Finnish research and innovation ecosystem, combining the priority areas

# Proposed implementation steps by the Food Research and Innovation Strategy

## Establish a Finnish Food Research Forum

- Develop a **shared vision** for food system transformation
- Promote **researcher training** and dialogue across disciplines and organizations
- Identify **new opportunities for cooperation** within the food sector to generate and support innovations.
- Organize workshops to **engage actors** to the transformation targets for the Finnish food system and multidisciplinary research needs, as well as to communicate research results, to **catalyze communication** between research, government and business actors
- **Create visibility** and influence food system transformation through white papers and opinion papers in national and international forums
- Coordinate the development and use of food and nutrition **research infrastructures** in Finland to foster innovation and implement research and to be compatible and integrated into European and international infrastructures

## Start a governmental food network

- Communicate and discuss EU's and Finnish policies, regulations, and targets in a coordinated, direct and timely manner across various ministries and research actors
- Consider and define joint actions among the Nordic countries, esp. with respect to a common Nordic agenda on food systems
- Initiate dialogues on setting-up a new funding mechanism across ministries and/or industry to secure resources for a critical research mass for solving the most important Finnish food system challenge

## Establish a network of business ecosystems

- Develop current ecosystems into a nationally coordinated activity for generation of innovations and new businesses
- Organize a series of match-making events under existing ecosystems and forums
- Utilize innovation ecosystems to raise industry interest towards new research topics (e.g., cellular agriculture, protein crops, insects) and create business from research via incubating start-

# Thank you!

**Link to Food Research and Innovation Strategy for Finland 2021-2035:**
https://www.vttresearch.com/sites/default/files/2021-03/Food-research-and-innovation-strategy-for-Finland_2021-2035.pdf

# Roadmap for RDI in the Finnish Food Industry

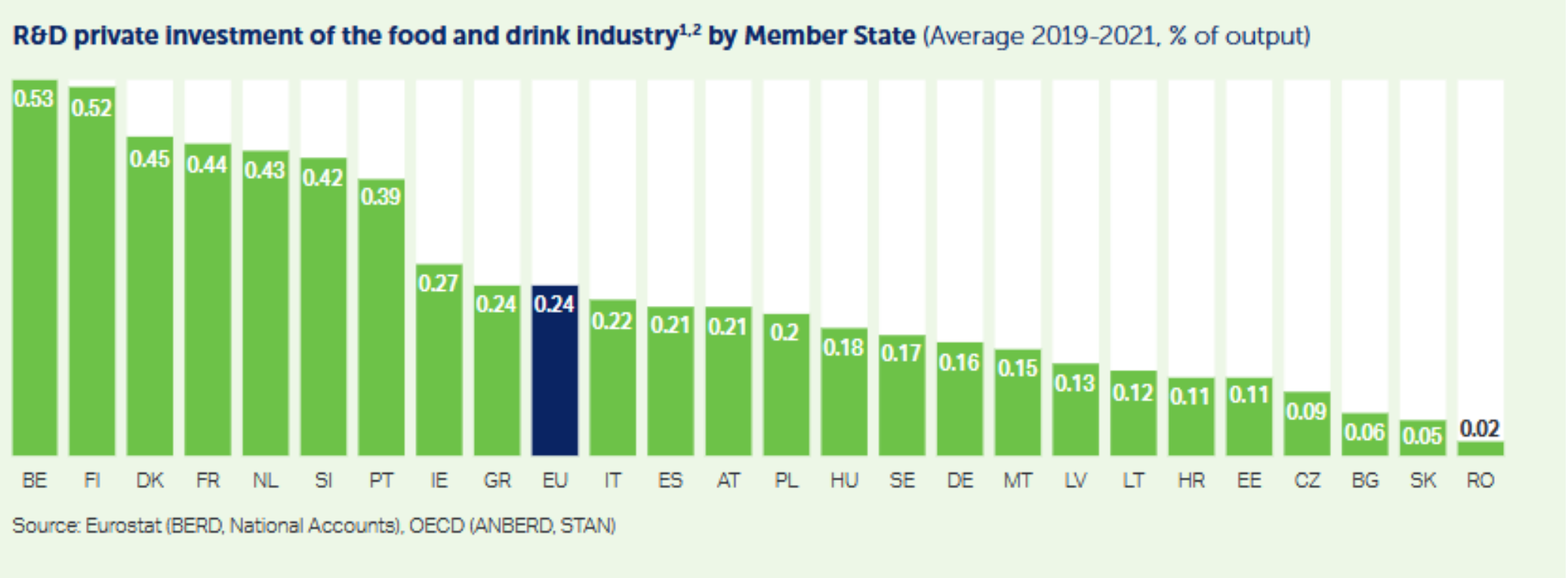
Marleena Tanhuanpää
Finnish Food and Drink Industries' Federation

# Successful food and drink industry creates well-being for Finland

- Finnish food industry employes 40,000 people in 2,600 companies (2022). The entire food sector employs 320,000 people, this figure also includes indirect jobs.
- The turnover of the industry was 13.8 Eur billion and the value added was 3.0 Eur billion.
- Food products were exported for 2.3 Eur billion, with 70% of the exports directed to the EU area.

# Finland leads in R&D investments in EU

In the food industry, Finland invests the second most in R&D activities among EU countries in relation to turnover. We were number one for many years.



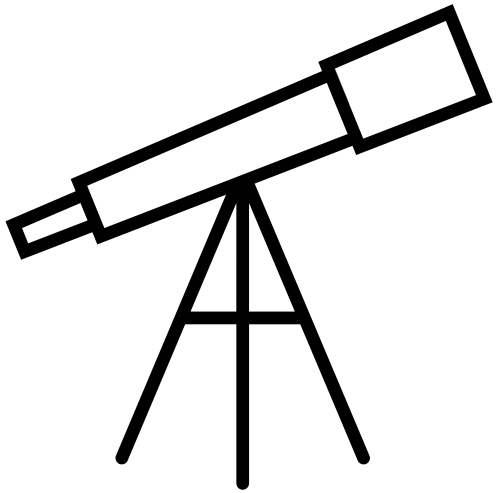
# The Finnish food industry needs innovation

The food industry aims to be a pioneer and set the direction for how the sector evolves and strengthens its competitiveness through innovation and the utilization of new technology.

ETL created Finland's first **RDI roadmap** in 2024. Its goal was to identify ways in which the food sector can achieve the nationally set target of four percent in RDI funding.


https://www.etl.fi/tilastot-ja-aineistot/selvitykset-ja-raportit/

# Vision 2030



- The Finnish food industry has risen to the forefront of smart and sustainable food production in Europe thanks to successful RDI investments.
- These investments have placed food production on a sustainable footing both economically and environmentally.
- Product development and the optimization of production processes have improved the competitiveness and profitability of companies.
- Innovations resulting from enhanced R&D collaboration have generated new added value and export growth, making Finland a food hub larger than its size.

# RDI roadmap

In the roadmap, functional, regulatory, and competence-related bottlenecks were identified that hinder the growth of investments directed towards research and development (R&D).

On the other hand, effective models and solutions were sought as keys to success.

## Change Objectives:

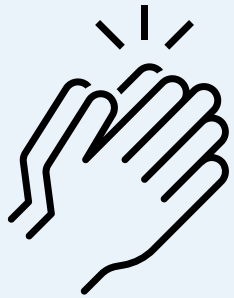
- Activation of SMEs in RDI activities.
- RDI support and services are easily accessible.
- Strengthening attraction and retention.
- Strengthening RDI collaboration.
- Towards long-term strategic RDI ecosystems.
- RDI funding supports a wider range of actors.

# Strengthening RDI collaboration.

**Change Objective:** Collaboration between the research community and food industry companies is active, information flows, and networks are open and transparent.

**Action to Achieve the Goal**:

- Establish a **Finnish Food Research Forum** to promote research and education in the food sector and to increase interdisciplinary discussion in accordance with the action proposal presented in the Finnish Food Research and Innovation Strategy 2021-2035.



**Food RDI-forum kick-off 19.3.2025**

Finnish Food and Drink Industries' Federation

INVESTMENTS

PRODUCT DEVELOPMENT AND INNOVATION

TRADE

A SUCCESSFUL FOOD INDUSTRY CREATES

WELL-BEING FOR FINLAND

B2B

Well-being

Makes everyday life easier

CONSUMER

Quality

Joy from food

PRIMARY PRODUCTION

EXPORT

FOODSERVICES

# Food Day (Elintarvikepäivä) 13.5.2025, Finlandia-hall

**Food Day** is the most anticipated training event of the year, organized together by the Food Research Foundation and the Finnish Food and Drink Industries' Federation.

The program includes a total of **32 expert** speeches on current themes.

Parallel program themes:

- **Regulation edges**
- **Inspiring innovations**
- **Export – Next level**
- **Digitalization and data for growth**
- **Market in transition**
- **Well-being from food services**
- **Brand appeal to employer image**

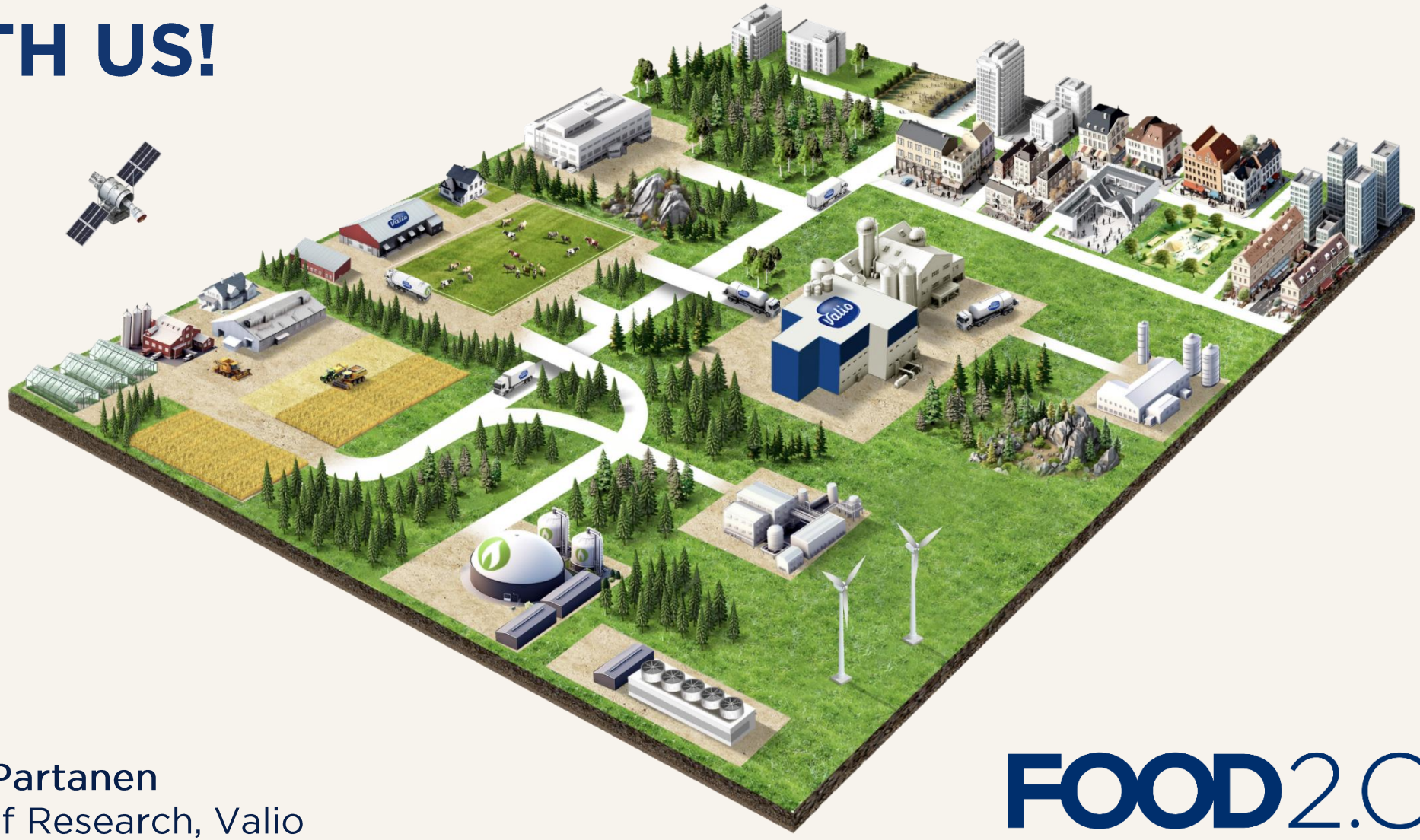
Selection of **exhibitors, delicious food, and networking**!
Please, register now [hthttps://www.etl.fi/elintarvikepaiva/](hthttps://www.etl.fi/elintarvikepaiva/)

# Thank you.
# Have a good seminar!

marleena.tanhuanpaa@etl.fi

Finnish Food and Drink Industries' Federation

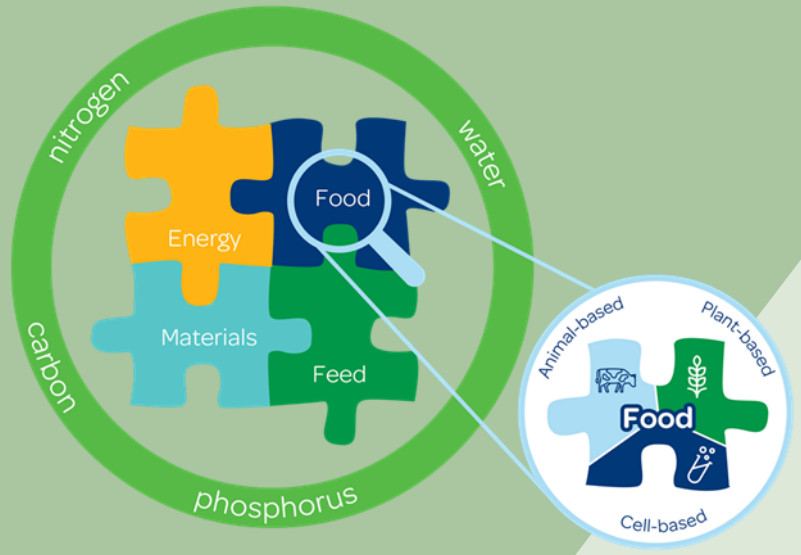
# JOIN THE JOURNEY WITH US!



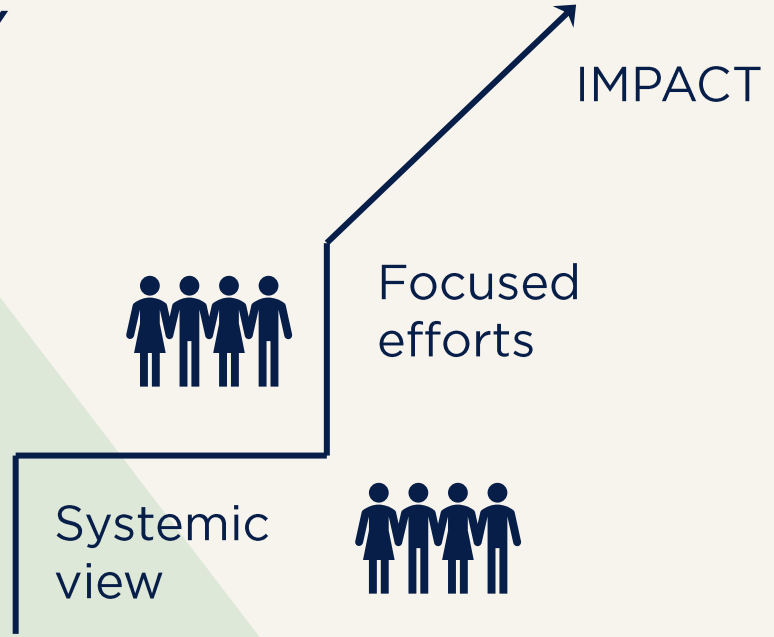
**Riitta Partanen**
Head of Research, Valio

FOOD 2.0 | Valio

# FOOD SYSTEM RENEWAL – WHAT DOES FINLAND NEED?




SUSTAINABILITY




SECURITY OF SUPPLY

COMPETITIVE BUSINESS

# Government food strategy work

Mikko Peltonen, MMM

# Need for the national food RDI forum

Anu Kaukovirta, Luke

# Rationale for the national food RDI forum

- Food system and food businesses is one of the growth areas in national strategies and political programs.  Very ambitious targets for export.
- Already for a along time in history, lot of activities and engagement related to RDI and business development in the food system.
- Both national and regional actors working in the RDI field and striving to promote RDI activities.
- However, working groups, associations, and ecosystems often operate in silos, which limits data transfer as well as co-development and co-innovation.
- **The establishment of an RDI forum for the food industry would enable the coordination of RDI activities and facilitate communication for the benefit of Finland's food system actors** – as already proposed in various strategies (e.g. Finnish Food Research and Innovation Strategy 2021–2035 & the Finnish Food and Drink Industries' Federation RDI roadmap).

# Active actors operating within the food system RDI



**Research and education**

- Research institutes
- Universities
- Universities of Applied Sciences and other educational institutions
- Food companies, companies providing RDI services

**National and regional ecosystems**

- Food 2.0 Valio Veturi
- Viikki Food Design Factory (UH)
- Food & Beyond (VTT)
- Flavoria (Turku, UTU)
- Food Valley (North Savo, UEF, Savonia etc.)
- Päijät-Häme Grain Cluster
- Frami Food Lab (Seinäjoki)
- **Many other regionally-led competence networks**

**Associations**

- Finnish Food and Drink Industries' Federation (ETL)
- The Central Union of Agricultural Producers and Forest Owners (MTK)

**Clusters**

- Protein cluster (VTT)
- PBL Powered by Luke

**Associations**

- The Finnish Cereal Committee (VYR)
- The Finnish Oat Association
- Pro Vege
- Pro Luomu
- Finnish Society of Food Science and Technology (ETS)
- Finfood – Finnish Food Information

- **AND MANY OTHERS**

Luke VTT UNIVERSITY OF HELSINKI ETL

# The objective and potential activities of the RDI Forum for the food sector

- **Objective is to improve collaboration and information flow**
  - Strengthening cooperation and co-development through workshops and the exchange of research results.
  - Sharing information about RDI project preparations & funding
  - Promoting networking among doctoral students
  - Developing a shared national research infrastructure (e.g., utilizing the AKA-FIRI-FOODNUTRI infrastructure).
- **Activities**
  - **Regular F2F meetings**
    - Workshops and seminars on specific topics + an annual RDI Forum seminar for the whole food sector (focusing on research and co-development)
  - **Other activities**

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Co-creation for ways of working in the national Food RDI Forum

# Working with Menti

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# Outlook for Future – National PhD work pitching session

Chair: Mari Sandell, professor

Food RDI-forum kick-off
19.3.2025

# Long-term changes in soil phosphorus in response to reduced grass phosphorus fertilization practice

Arja Louhisuo

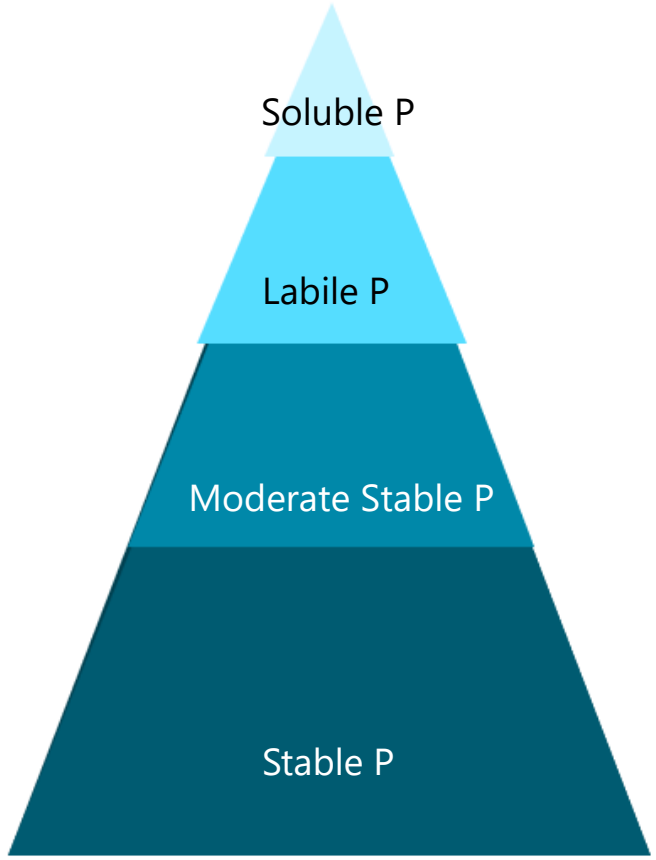
Luke

# Grass-based cattle farming in Finland and phosphorus (P)



- Perennial grasses are well adapted to Nordic climate conditions.
- Cattle convert grass energy into high-value protein.
- Phosphorus (**P**), along with nitrogen and potassium, is essential for plant growth and animal health.
- P rock availability will decline by the 2030s.
- Heavy P fertilization (1960-1990) increased P leaching to waterways and led to a build-up of soil P reserve **called legacy-P**
- The most of legacy-P is poorly plant-available (stable or moderate stable P) and therefore considered useless for plants.

Portions of P reserves in soil




- **Hypothesis:** Legacy P can supply P to perennial **grasses**.
- **Goal:** Quantify the effect of P uptake by grass on legacy P pools.
- **Study:** Long-term grass experiment on two sites (2003-2020).
- **Treatments:** No P application (P0; control) and currently recommended, reduced P applications.
- **Measurements:** P uptake of grass and soil P fractions

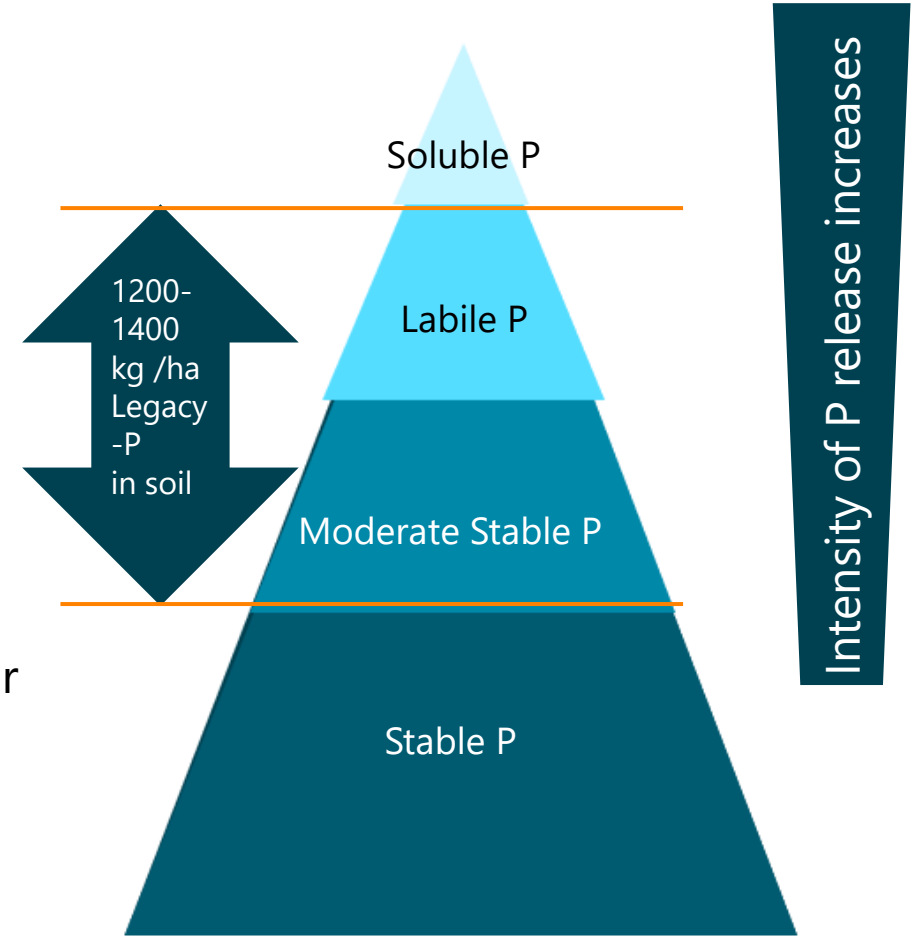
Luke

# Main Points of Study



- Soil **legacy P reserves were high,** more than 1000 kg P/ha
- Within almost 20 years, **P uptake was 350-400 kg P/ha** without P fertilizer application (P0)
- P0 produced as high grass yield as recommended P -> efficient uptake of P from reserves in the following way:
  - about 10 % from Soluble P
  - About **30-50 % from Labile P**
  - **over 50 % from Moderate Stable P pool,** where P release intensity to plants has considered to be low.
  - No P from Stable pool.

Our results suggest **a re-evaluation of P application guidelines** for grass production in Finland.
**Many grass farmers could rely more on legacy P.**




Luke

# Gains for society and application possibilities for companies

1. Grass-based cattle farming **reduces rock phosphate mining**, lowers soluble phosphorus in soil and therefore **lowers eutrophication risks**.
2. A standardized **method to measure legacy P** should be developed and **integrated into** fertilization planning **softwares**.
3. Further research is needed on the impact of climate change on phosphorus uptake by perennial grasses to create "**a P uptake forecast**".
4. My motivator is to improve the sustainability and acceptability of grass-based cattle farming in the food chain

Luke

# Long-term changes in soil phosphorus in response to reduced grass phosphorus fertilization practice

**Arja Louhisuo**
**Natural Resources Institute Finland (Luke)**

**University of Helsinki, Faculty of Agriculture and Forestry,**
**Department of Agricultural Sciences**
**Supervisors: Markku Yli-Halla, Perttu Virkajärvi, Frederick Stoddard**

**2021-2026**

**Funding: e.g. Fomare-project by MMM Makera, Luke and Yara Suomi Oy**

luke.fi

# Side streams as feedstock for cellular agriculture

Eevi Haajanen

VTT

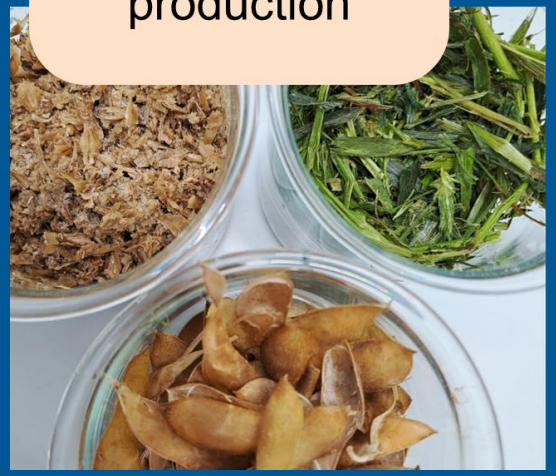
# Building sustainable food system with help of cellular agriculture

- Cellular agriculture will offer novel food products produced with microbial cells to build future of food together with traditional agriculture
- Among food ingredients made by cellular agriculture, microbial protein will provide sustainable solutions for increased demand for food
- However, there is a need to discover new feedstocks for development of sustainable and feasible fermentation processes

→ My PhD topic: **Side streams as feedstock for cellular agriculture**

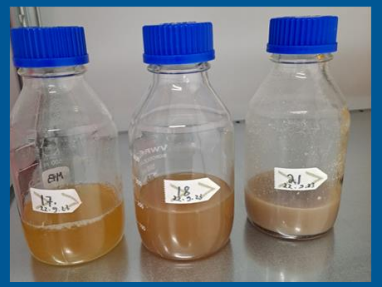
# From side streams to microbial protein

Side streams from agriculture and food production



Pretreatments for nutrient release

Microbial fermentations



Microbial protein ingredient for food

Sustainable food production will benefit the whole society by increasing food security and boosting circular economy

Utilization of side streams and waste material will provide companies possibilities to create additional revenue instead of waste disposal costs

Cellular agriculture companies will benefit from cheap and sustainable feedstocks

## Best part of doing this PhD

Getting to think outside of the box and diving to hands on work with the side streams and microbes!

# Side streams as feedstock for cellular agriculture

**Eevi Haajanen**
Research Scientist, Bioprocess Engineering, VTT

Aalto University, Doctoral programme in Chemical Engineering, Biotechnology
Supervising professor: Paula Jouhten
Thesis advisors: Emilia Nordlund (VTT), Anneli Ritala (VTT)
PhD schedule: 2022 – 2027

*The work was supported by Food without Fields (VN/28558/2020) project funded by the Ministry of Agriculture and Forestry of Finland and VTT's iBex Future Food Court project (2023-2024)*

# Passive atmospheric water collection for arid/semi-arid areas

Soroush Moradi Zavie Kord

University of Helsinki

# ATHMOSPHERIC WATER GENERATORS

## DEW & RAIN COLLECTORS FOR ARID/SEMI-ARID REGIONS


Helsinki, Finland.
Mar. 2025

UNIVERSITY OF HELSINKI

# RESEARCH AREA

Aim and Objective

## Problem:

**Climate change.**
**Drought & water scarsity:** Increasingly frequent and severe droughts are intensifying water scarcity.

## Solution:

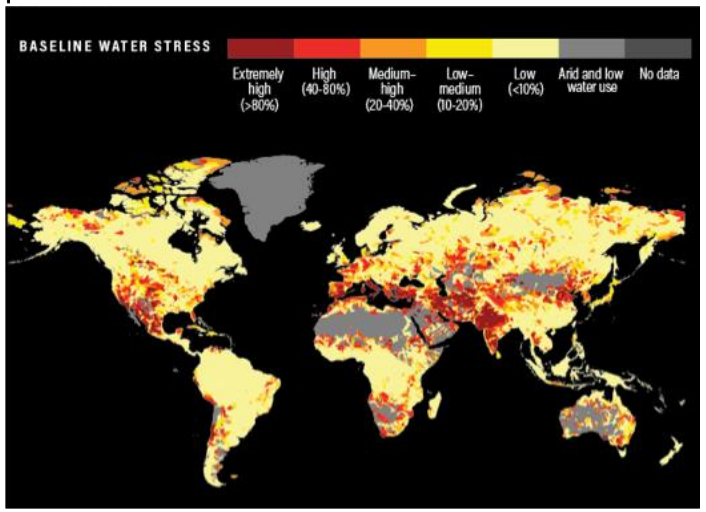
**Atmospheric water:** This renewable source of water is available everywhere, even in arid regions, making it a vital solution for addressing water scarcity.

## Users:

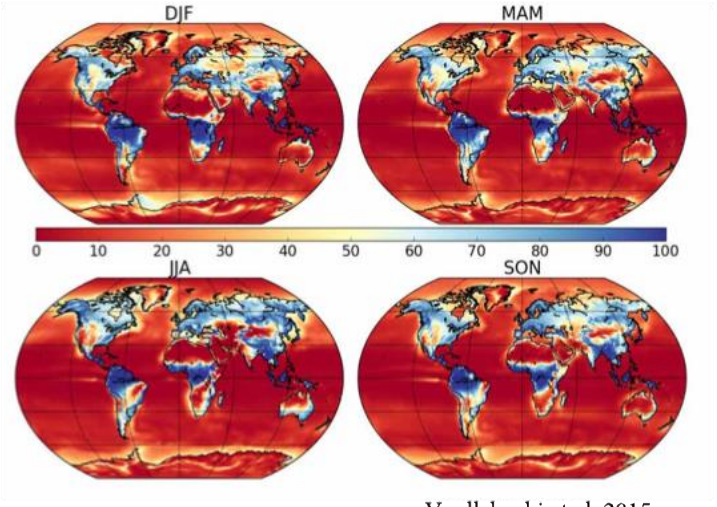
**Small scale farmers:** e.g. off-grid households and rural communities.
**Enviroment:** Restoration of ecosystems and biodiversity.

Atmospheric water generator provides a sustainable and decentralized way to support agriculture, communities, and ecosystems, reducing reliance on depleting groundwater and traditional water sources.

**problem**




**solution**




Vuollekoski et al. 2015

**user**

Helsinki, Finland.
Mar. 2025

HELSINGIN YLIOPISTO

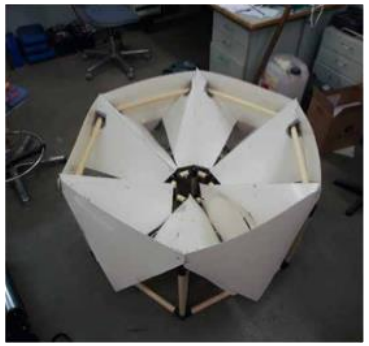
# COLLECTOR

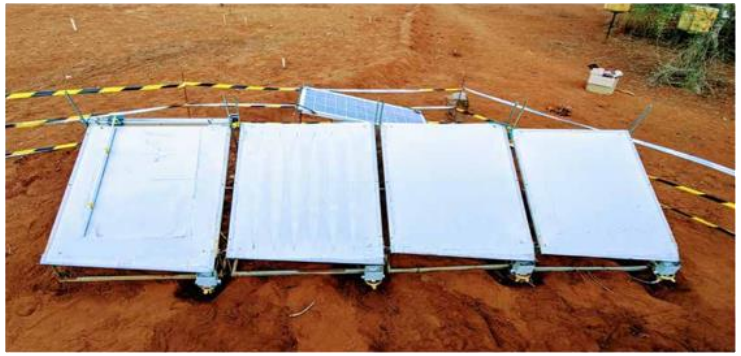
Passive dew collector

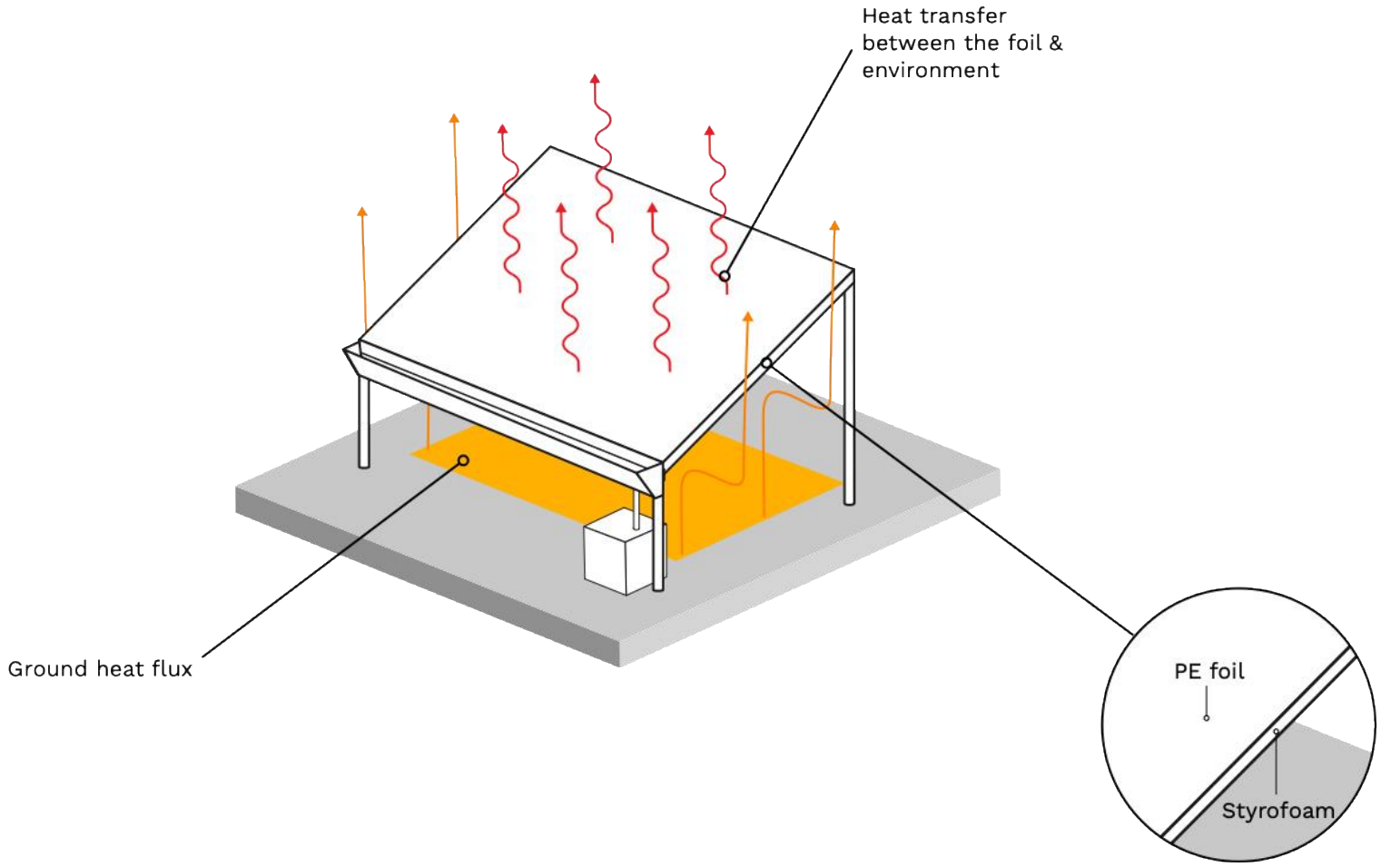
**Dew collectors:** They are passive collector that do not require additionale energy input.

**Nocturnal:** Water collection occurs at night through radiative cooling via the atmospheric window.

**Parameters:** Collection rate depend on RH, Temp. and wind speed.








Helsinki, Finland.
Mar. 2025

HELSINGIN YLIOPISTO

# COLLECTOR

## Field tests

1 **2020**
Oct. - Nov.
Viikki, Finland.

### Field test 1.0

Standard Planar Dew Collector was placed along the Enhanced dew collector that is based on Master thesis results.

The surface temperature and water collection potential were studied and compared during Oct. - Nov. 2020 at Viikki, Finland.

2 **2021**
May. - Nov.
Viikki, Finland.

### Field test 2.0

Four dew collectors were placed on open field condition at Viikki, Finland between May. - Nov. 2021.

The collectors' design were all based on Standard Planar Dew Collector, with a frame that keeps the collection area inclined 30° from horizontal and use gravity-induced collection.

Standard Planar Collector is the reference panel, comparing the yields/water collection potential of other collectors (i.e. Sandblasted, Wire and Ridge collectors).

The surface temperature of the panels collected rain and dew, wind speed and direction, ambient temperature, humidity, UV radiation and precipitations were measured and logged to study the effects and parameters that enhance the dew and rain collection.

3 **2022**
Jun. - Oct.
Viikki, Finland.

### Field test 2.1

This field setup is the same as field test 2.0, with renewed polyvinyl chloride (PVC) collection foils. The same hypothesis is tested in the same location as Field test 2.0 in Jun. - Oct 2022.

Besides the weather station that collects the same data (Temp., humidity, wind speed and direction and UV radiation) there are additional soil moisture sensors and IR sensors (in addition to the thermocouple wires) that logged the surface temperature of individual panels.

To further study the dew formation pattern, a custom jig was built to photograph the dew formation and collection process during the dew events at night.

The data from summer 2021 and 2022 are combined to make a comprehensive study of surface and geometry manipulation's effect on dew and rain collection as well as the effect of collected water deposition on soil moisture.

4 **2022 -2023**
Oct. - Feb.
Taita-Taveta, Maktau, Kenya.

### Field test 3.0

This field setup is in the arid area of Maktau, Kenya; starting on Oct. 2022 - Feb 2023.

Standard Planar Collector along with Sandblasted, Wire and Auto. wiping are placed alongside each other and the collector dew is measured by tipping rain gauges.

The collected water is transferred to the back of the panel to grow seedlings.

5 **2023**
Mar. - on going
Taita-Taveta, Maktau, Kenya.

### Field test 3.1

This field setup is in the arid area of Maktau, Kenya; starting on Mar. 2022 and still ongoing. Standard Planar Collector along with Sandblasted, and Auto. wiping are placed alongside each other and the collector dew is measured by tipping rain gauges. The soil moisture is measured at three different depth.

The collected water is transferred to the back of the panel to grow seedlings.

Helsinki, Finland.
Mar. 2025

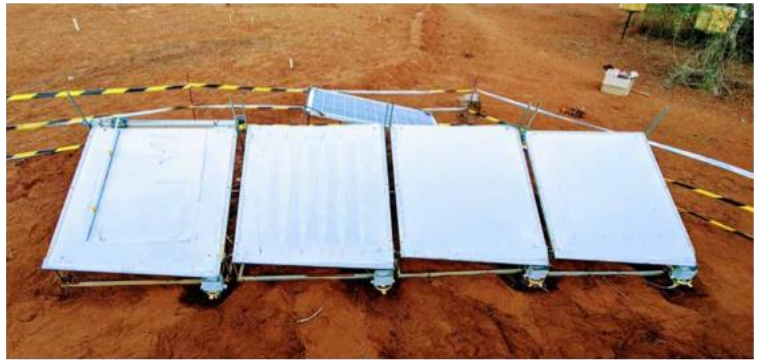
HELSINGIN YLIOPISTO

# COLLECTOR

Filed test - Kenya

**Field Test in Kenya:** Four panels were installed on a local farm in Kenya, where four seedlings were planted.

Key parameters, including soil moisture, air and surface temperature, and collected water, were monitored and logged. A solar panel was added to power the scientific equipment.



Seedlings planted in the experiment grew efficiently in the dry season, indicating the sufficency of collected water for their survaivol and growth.

The soil moisture water content data also indicated an increase in the SWC.

Helsinki, Finland.
Mar. 2025

HELSINGIN YLIOPISTO

# ATHMOSPHERIC WATER GENERATORS

## DEW & RAIN COLLECTORS FOR ARID/SEMI-ARID REGIONS

**Soroush Moradi**
Soroush.MoradiZavieKord@helsinki.fi

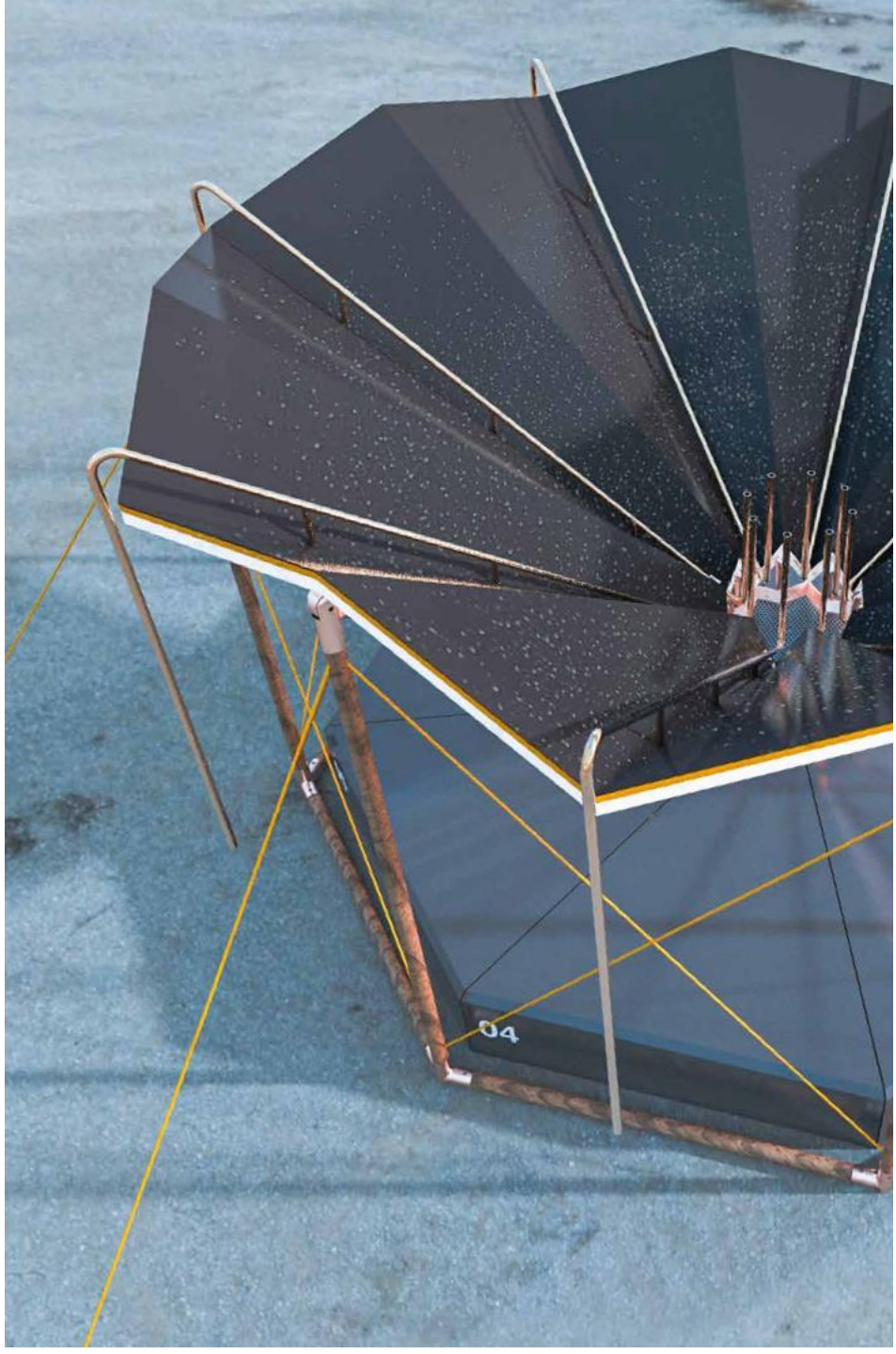
**University of Helsinki.**
Department of Agricultural Science - Faculty of Agriculture and Forestry.

**Supervisors:**
Prof. Laura Alakukku, Dr. Matti Räsänen, Dr. Juuso Tuure, Docent Szabol Galambosi.

**Main funding:**
Maa- ja vesitekniikan tuki (MVTT), University of Helsinki.

MVTT

HELSINGIN YLIOPISTO



# Microbial lipids for food

Fiona Småros

VTT


Tasty and healthy
plant-based
alternatives

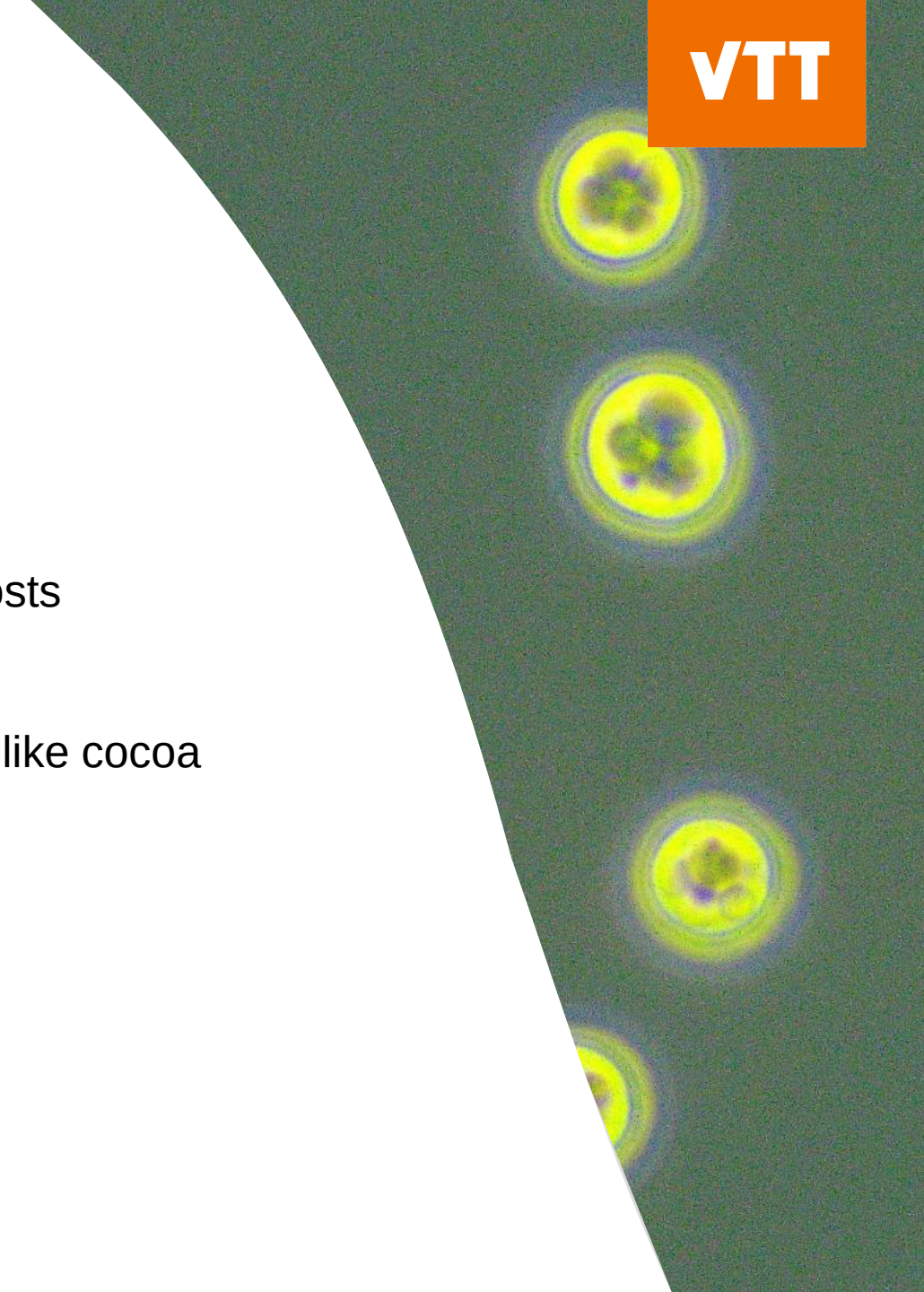
# Microbial lipids for food

Microbially produced lipids offer a more sustainable alternative with many benefits:

**Economic:** Controlled production and predictable costs

**Functional:** Lipids can be tailored into specialty fats like cocoa butter or made healthier by lowering saturation

**Environmental:** Low land use, no pesticides needed



# PhD focus points

- Comparison of microbial lipids to traditional food lipids
- How to tailor the lipid production to specific fats?
- How to break the cell wall and extract the fat?
- How could these lipid producing cells be incorporated into a microbial food product?

Food Research International
Volume 200, January 2025, 115481

## Microbial production of food lipids using the oleaginous yeast *Apiotrichum brassicae*

Fiona Småros [a], Virve Vidgren [a], Kato Rondou [b], Kaisu Riihinen [a], Pezhman Mohammadi [a], Koen Dewettinck [b], Filip van Bockstaele [b], Kari Koivuranta [a], Nesli Sozer [a]

https://doi.org/10.1016/j.foodres.2024.115481

# Best part of doing this PhD

I get to deep dive into this interesting research topic!
Working towards sustainability, reducing the use of palm oil

# Microbial lipids for food

**Fiona Småros**

Research Scientist, Bioprocess engineering, VTT

Aalto University, Doctoral programme in Chemical Engineering, Biotechnology

Supervising professor: Paula Jouhten

Thesis advisors: Kari Koivuranta (VTT), Nesli Sözer (VTT)

PhD schedule: 2024 – 2028

*The work is supported by CERAFIM project (2022-2024), a co-innocation project funded by Business Finland (ID9392/31/2021), VTTs internal lipid platform funding (Apilipid project), and FoodID project (2025-2027) funded by Business Finland (ID3545/31/2024)*

# Structure formation and interactions of oat macromolecules

Miikka Laitinen

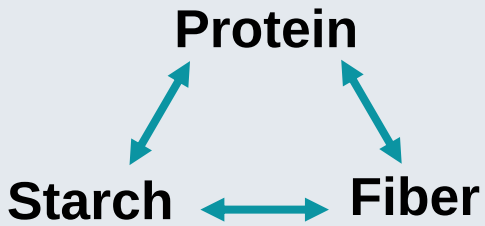
University of Helsinki

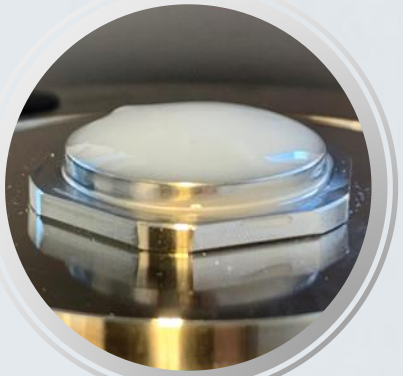
# BETTER STRUCTURES FOR OAT-BASED FOOD PRODUCTS

**How to understand the role of oat components in food structure?**

Interactions of **oat fiber**, **starch** and **protein**

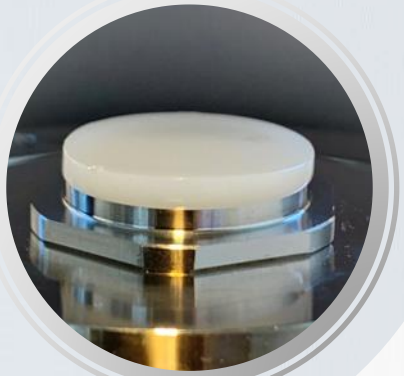
**Simplified gel model**
→ fundamental research



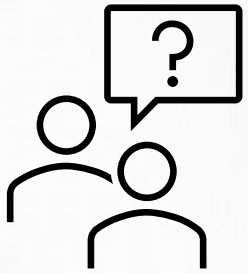



**Why do we get structures like this…**

**…or like this**



# WHAT'S IN IT FOR US?



## CONSUMERS

Better oat-based products on the market

## SOCIETY

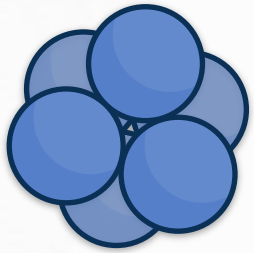
Benefits for public health

## COMPANIES

Leading knowledge on oat ingredients → export potential

# HOW COULD COMPANIES APPLY MY RESEARCH?

*OAT PROTEIN*



*My PhD research*

**Optimized gelation**

1. Conditions
2. Enzymatic modification
3. Interactions with starch

**Oat protein with good techno-functionality**

# WHAT **MOTIVATES ME** IN THIS WORK?

**PROBLEM SOLVING**

There are things we can do to improve oat ingredients!

**BEST OF BOTH WORLDS**

Fundamental research with direct connection to practical applications

**IMPACTFUL RESEARCH**

Oats are a hot topic in the industry and academia

# STRUCTURE FORMATION AND INTERACTIONS OF OAT MACROMOLECULES

**Miikka Laitinen**
miikka.laitinen@helsinki.fi

University of Helsinki
Faculty of Agriculture and Forestry
Department of Food and Nutrition

Research Council of Finland

J&AE JANE AND AATOS ERKKO FOUNDATION

**TIMING**

2022–2025
Estimated defence 12/2025

**SUPERVISORS**

Assoc. Prof. Ndegwa H. Maina
Dr. Noora Mäkelä-Salmi

**FUNDING**

Research Council of Finland
Jane and Aatos Erkko Foundation

# Longitudinal transcriptomic analyses of food spoilage microbiomes

Julia Manninen

University of Helsinki

# FOCUS OF MY THESIS IS ON RNA TO REVEAL ACTIVE BACTERIAL METABOLISM

- Cannot be achieved using DNA-based analysis
- Longitudinal transcriptomic analyses
  - RNA-seq & metatranscriptomics
  - Active spoilage species and pathways
  - Longitudinal studies = changes in microbiome and metabolism over time
- New & exciting method for microbiome analysis
- Food spoilage species well-known, their activity and interactomes not

# IMPACT OF RESEARCH

- Aim: RNA markers associated with food spoilage in the course of time
  - Current methods don’t predict rate of spoilage
  - Better prediction of food spoilage

- Benefits:
  - Dynamic sell-by dates = Less food waste
  - Enables development of sensors or other technologies
  - Fewer acceptable products discarded based on rigid sell-by dates

# LONGITUDINAL TRANSCRIPTOMIC ANALYSES OF FOOD SPOILAGE MICROBIOMES

MY DETAILS

Julia Manninen

PhD timeline: 2024-2027

Defense planned for late 2027

- Department of Food Hygiene and Environmental Health (EHYT)
- Faculty of Veterinary Medicine, University of Helsinki
- Supervisors:
  - Professor Johanna Björkroth
  - PhD Per Johansson

Suomen Kulttuurirahasto

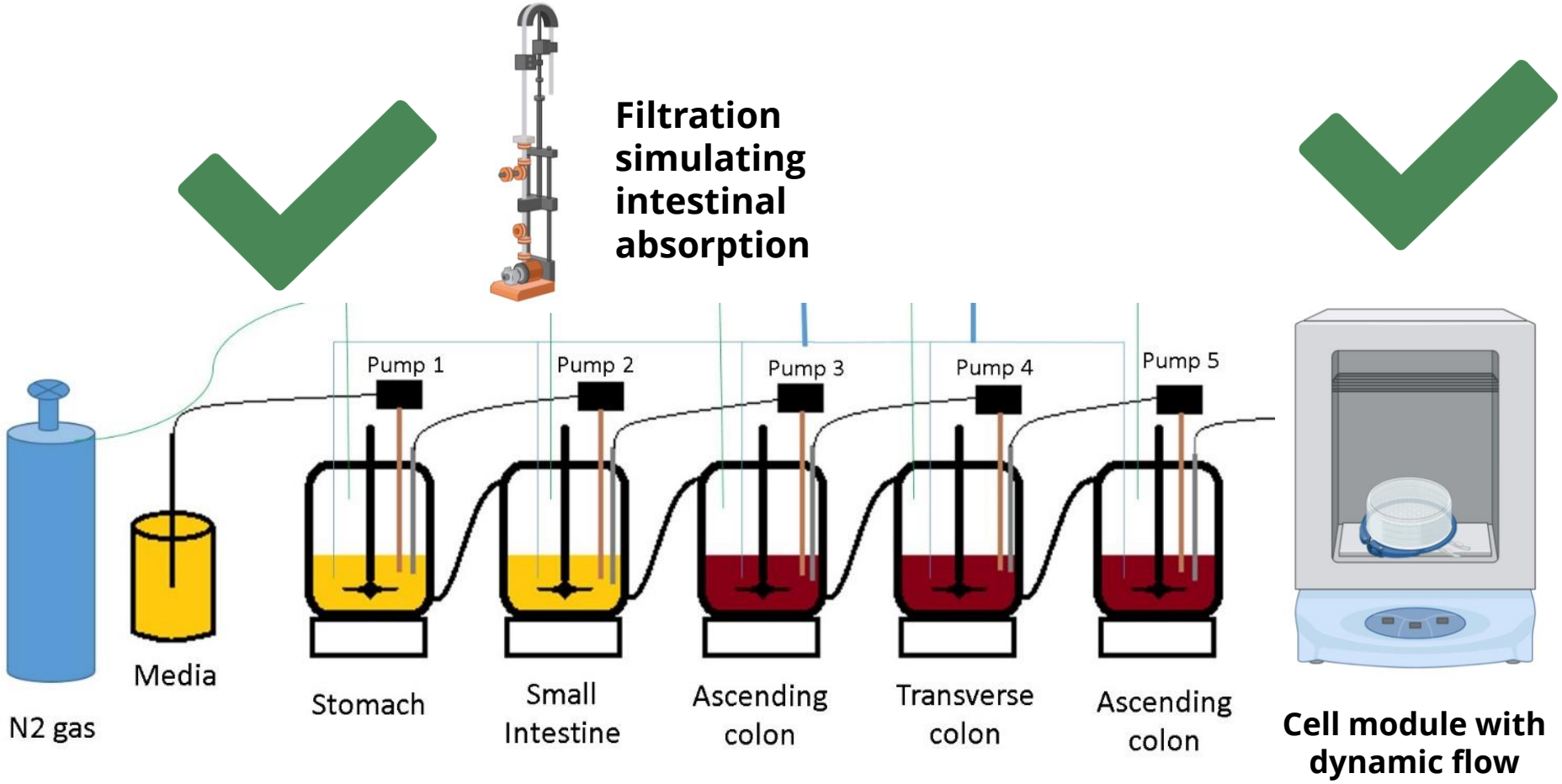
novo nordisk

# From microbes to mechanisms: Advancing gut health research with a dynamic multistage in vitro gastrointestinal model

Moona Partanen

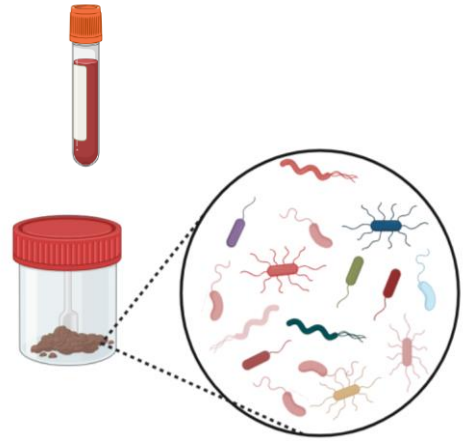
University of Eastern Finland

# Dynamic multistage *in vitro* gastrointestinal model



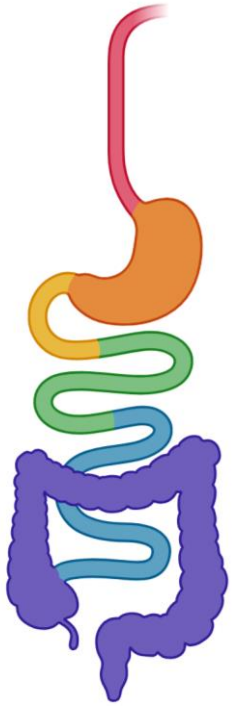
# Integration of *in vitro* and clinical *in vivo* data

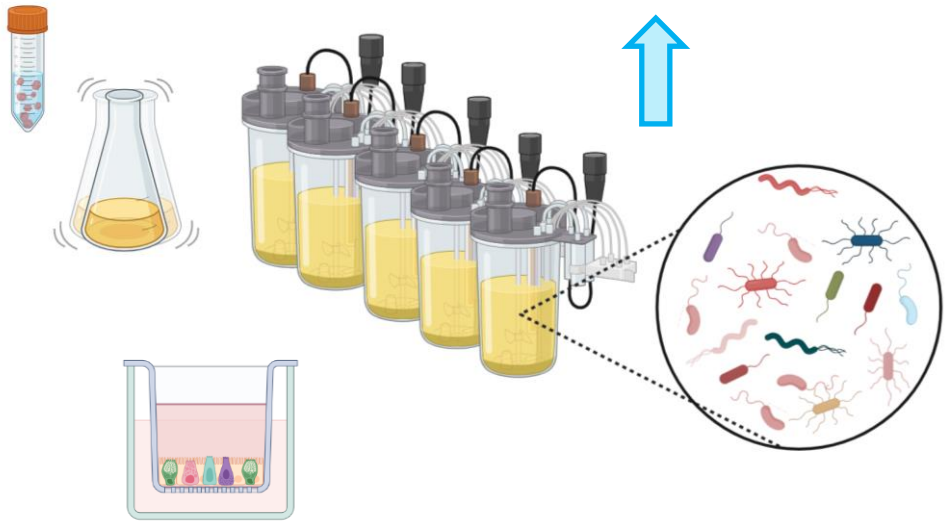
**Complex protein and fiber rich plant-based foods**

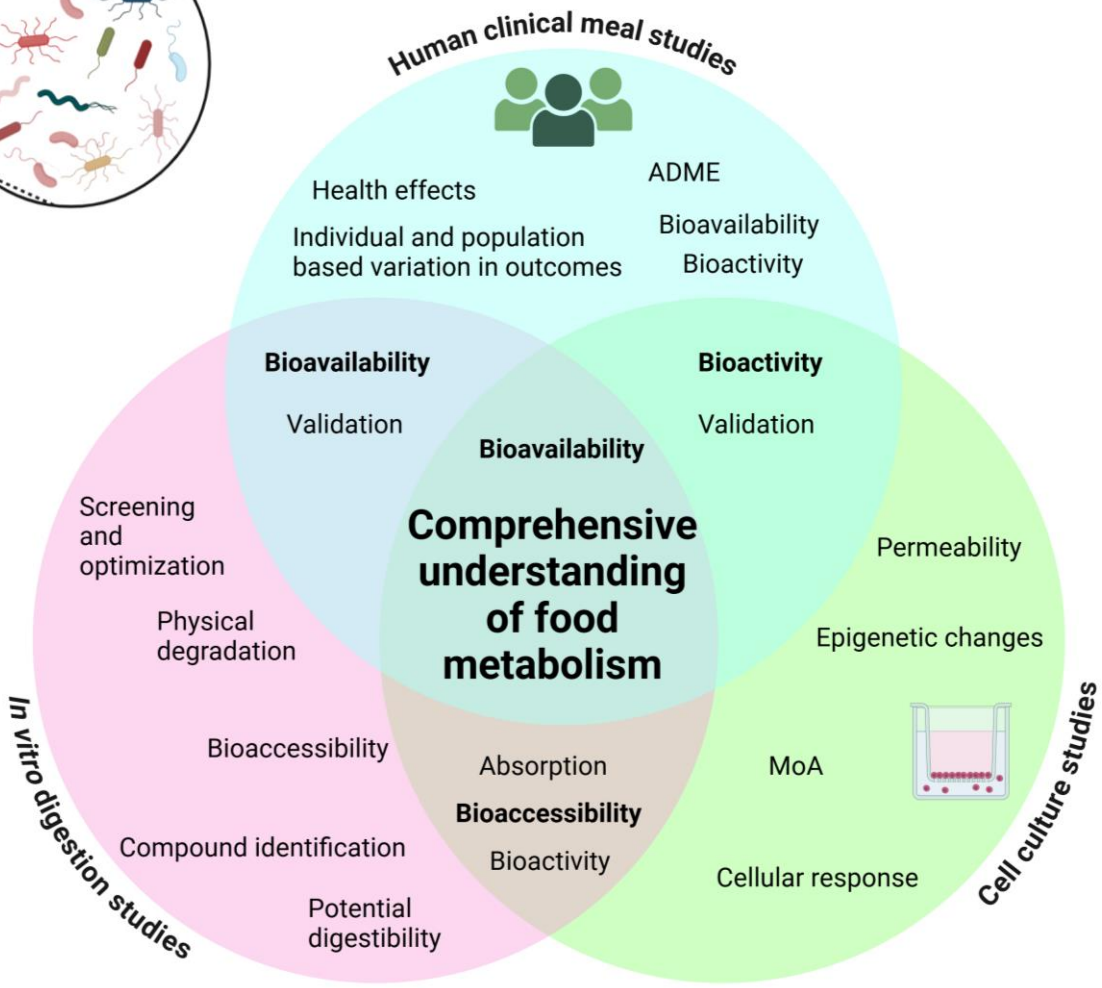


**Impact on health**

**Digestion kinetics and MoAs**








Jos olet 30-65 vuotias ja sinulla on ylipainoa, tervetuloa osallistumaan tutkimukseemme! Itä-Suomen yliopiston kliinisen ravitsemustieteen yksikössä alkaa tutkimus, jossa selvitetään, miten kuitu vaikuttaa eri proteiinienlähteiden aineenvaihduntaan, ihmisen kokonaisvaltaiseen terveyteen ja suolistomikrobistoon.

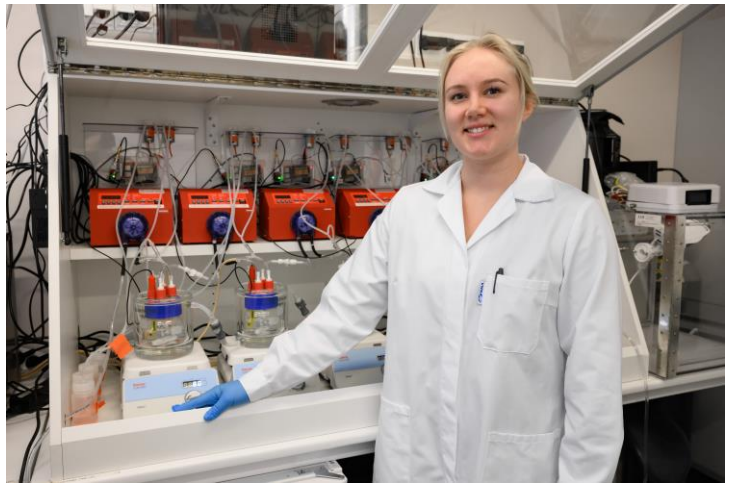
Tutkimukseen sisältyy viisi tutkimuskäyntiä keväällä 2024 Kuopion kampuksella. Tutkimuskäynnit ovat arkiaamuisin ja kestävät n. 4,5 tuntia.

Ilmottautumiset ja lisätietoa saat väitöskirjatutkija Moona Partaselta joko sähköpostilla moona.partanen@uef.fi tai puhelimella 050 475 9536.

Lisätietoa osoitteessa
**uefconnect.uef.fi/tutkimusryhma/COBRA-tutkimus**

Euroopan unionin osarahoittama

UNIVERSITY OF EASTERN FINLAND



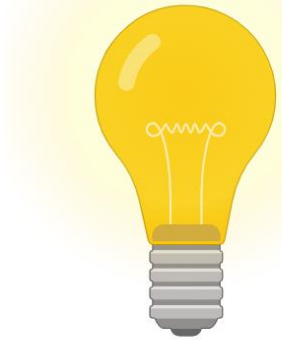
**Service platform available for companies and collaborators**

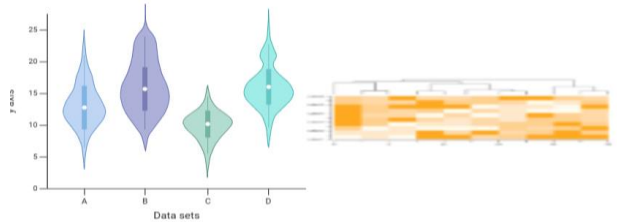
2024

2025

2026

**2027**






**Data integration and analysis**

# From microbes to mechanisms: Advancing gut health research with a dynamic multistage *in vitro* gastrointestinal model

***2023-2027***


## Moona Partanen

*University of Eastern Finland, Institute of Public Health and Clinical Nutrition*

Supervisors: **Prof. Marjukka Kolehmainen, Dr. Carlos Gómez-Gallego, Dr. Otto Savolainen**



Main funder: European Regional Development Fund of the Northern Savonia Regional Council (No A80407)

# Health effects of oats as part of a low-gluten diet

Enni Mannila

University of Turku

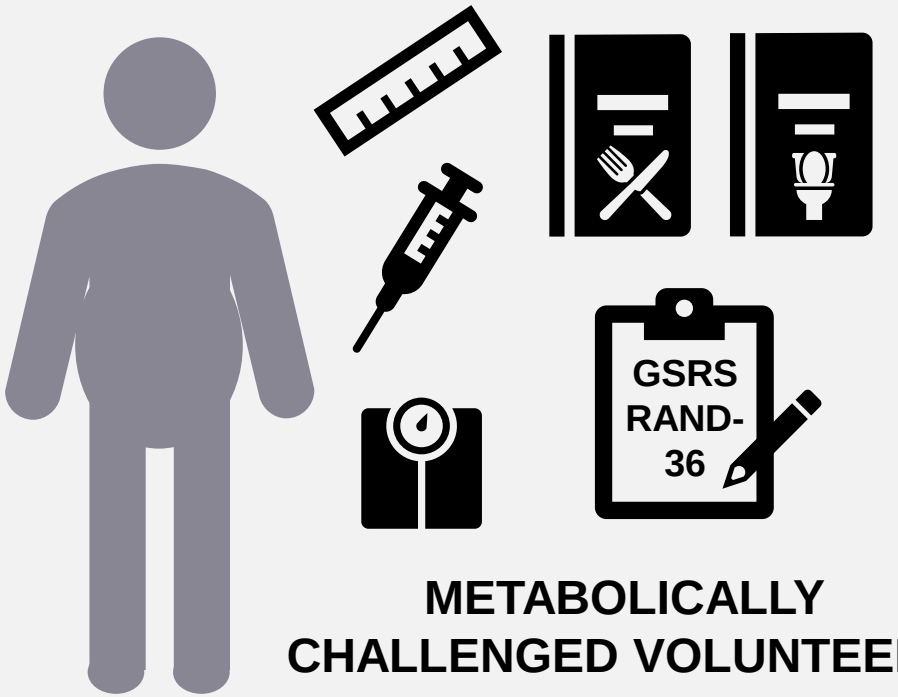

Tensoval
Contour TS
OAT
GUT
BRAIN

# RANDOMIZED CLINICAL TRIAL

## LOW-GLUTEN DIET WITH EITHER

OATS OR RICE

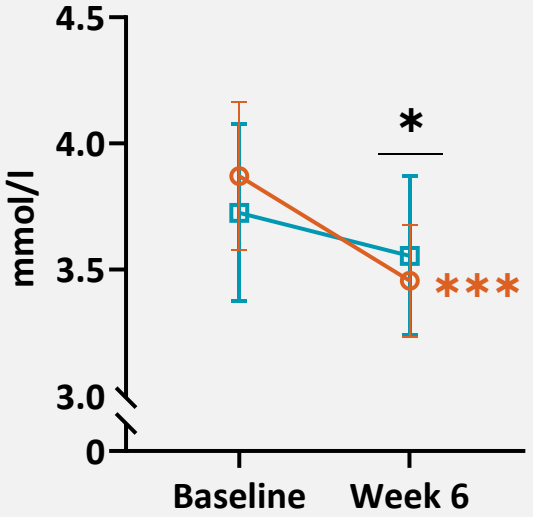
4 PORTIONS PER DAY



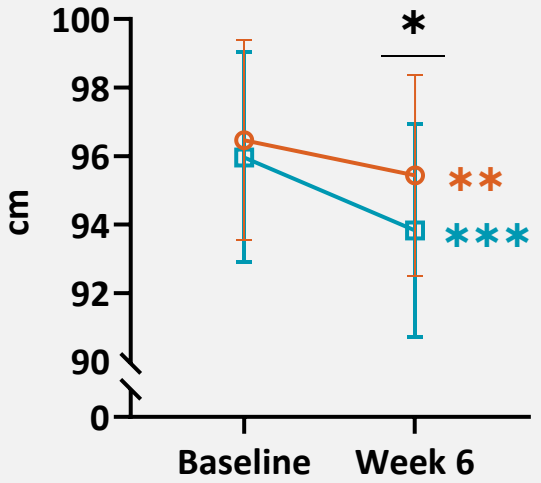

METABOLICALLY CHALLENGED VOLUNTEERS

MAIN CHANGES AFTER 6 WEEKS

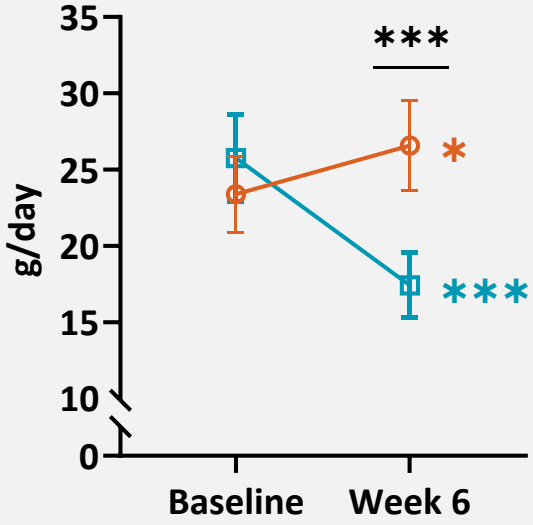
## LDL-C



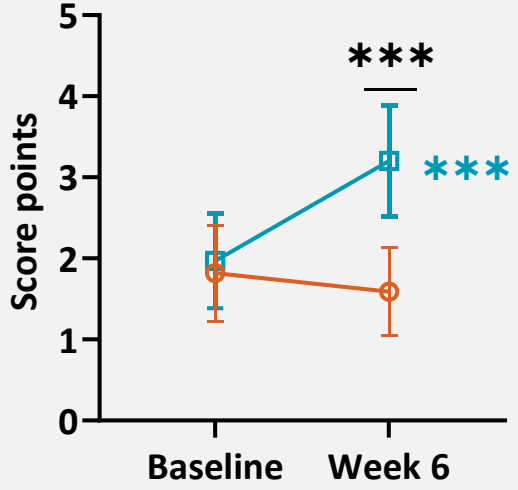

## WAIST CIRCUMFERENCE




## FIBER INTAKE




## CONSTIPATION



Ärtyvän suolen oireyhtymä

YLE 24.10.2018

## Ärtyvä suoli vaivaa joka kymmenettä työikäistä

## *IBS affects one in ten working-age people*

Health

YLE 26.7.2024

## Coeliac disease continues to rise in Finland

The Finnish Coeliac Society estimates that up to 70,000 Finns may have the autoimmune condition without being aware of it.

Domestic news

YLE 19.8.2023

## Finland eats too much saturated fat, nutritionists say

Saturated fats are most common in meat and dairy products.

Nuoret

YLE 25.10.2024

## Lasten ja nuorten lihavuusleikkaukset alkavat Suomessa ensi keväänä

## *Obesity surgeries for children and young people will begin in Finland*

Domestic news

YLE 4.12.2023

## THL: Finland's fat population hits 1m

In addition to carrying excess weight, Finns also suffer from high cholesterol and elevated blood pressure, according to a study by public health authority THL.

UNIVERSITY OF EASTERN FINLAND

UNIVERSITY OF TURKU


UNIVERSITY OF EASTERN FINLAND

UNIVERSITY OF TURKU

# Health effects of oats as part of a low-gluten diet

**Enni Mannila**

**ensoma@utu.fi**

University of Turku

Faculty of Technology

Department of Life Technologies

Unit of Food Sciences

OAT-GUT-BRAIN is a co-operation between UTU and UEF;

Co-PIs Prof. Kaisa Linderborg and Prof. Marjukka Kolehmainen

**PhD supervisors:** Kaisa Linderborg, Kati Hanhineva

**Schedule:** 2022–2026, estimated time of defence: 5/2026

**Funding:** Finnish Cultural Foundation, University of Turku Graduate school UTUGS, Raisio plc's Research Foundation, Niemi Foundation, Finnish Food Research Foundation

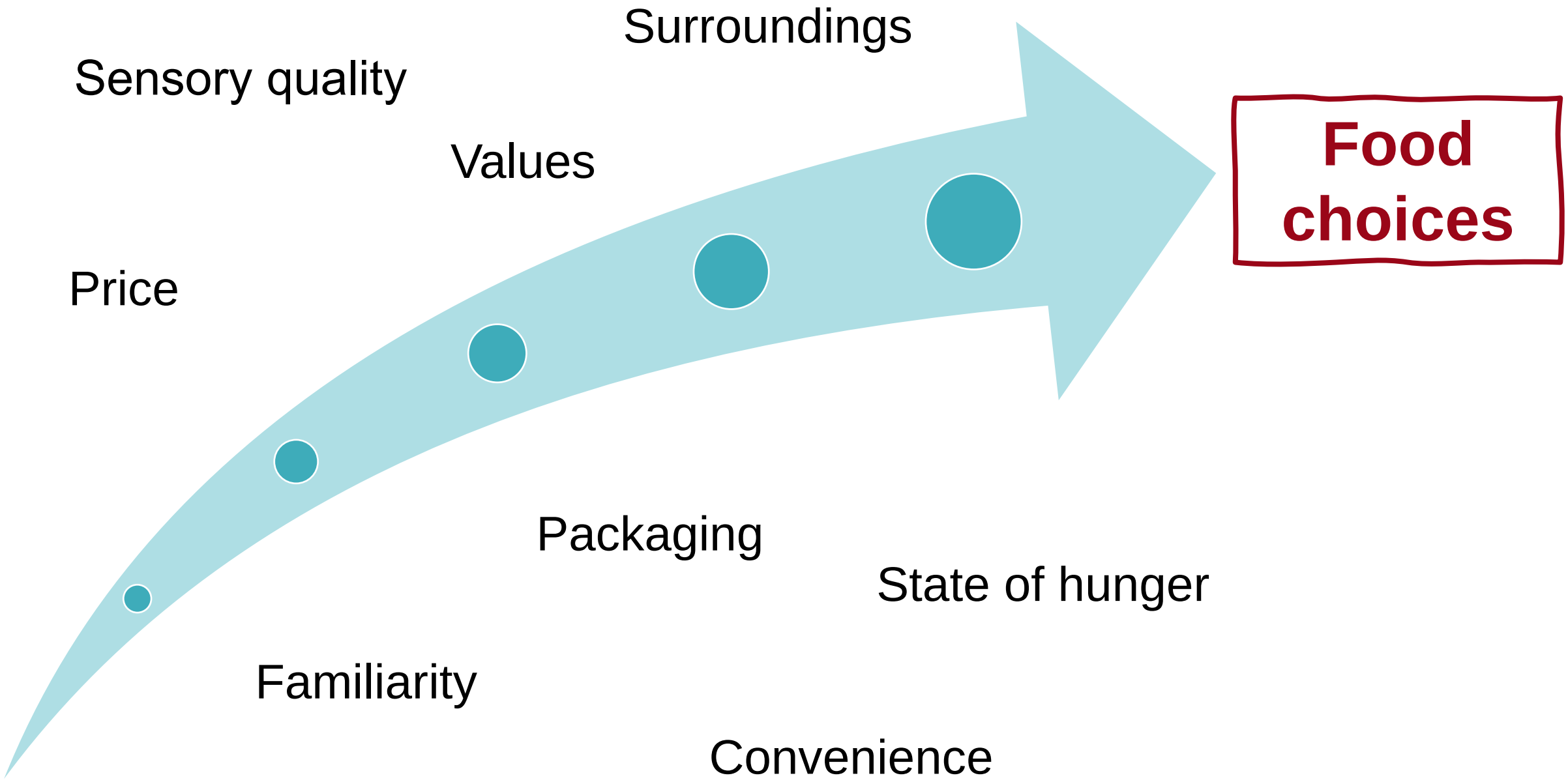
UNIVERSITY OF EASTERN FINLAND

UNIVERSITY OF TURKU

# Something old, something new: Consumer interest in traditional and novel Baltic herring products

Nora Logrén

University of Turku




UNIVERSITY OF TURKU

*Photo: Nanna Rintala*

UNIVERSITY OF TURKU








UNIVERSITY OF TURKU

# Something old, something new:
## Consumer interest in traditional and novel Baltic herring products

Nora Logrén
nodalo@utu.fi

University of Turku
Faculty of Medicine
Nutrition and Food Research Center

Supervisors: Anu Hopia, Mari Sandell

Schedule: 2022-2025, Estimated year of defence: 2025

Funders: Jenny and Antti Wihuri Foundation,
European Maritime, Fisheries and Aquaculture Fund

UNIVERSITY OF TURKU

NUTRITION AND FOOD RESEARCH CENTER

# NEXT STEPS
# in Food RDI Forum

# Next steps and actions in Food RDI Forum

**THANK YOU FOR YOYR FEEDBACK, we go it thoroughly through and use for future preparatory work.**

## Preliminary plans

**1. Annual seminar**

- Annual Food RDI Forum seminar in autumn (Food Day (Elintarvikepäivä) in Spring, RDI Seminar in autumn)
- **First Annual Seminar on Friday 31 October 2025**
- Program includes
  - Further brainstorming of the RDI Forum working model; Discussion on funding models
  - **Showcasing regional projects**
  - Co-creation sessions for developing new projects; Presentations on funding opportunities; Pitching sessions for scientific results and project outcomes.

**2. Tools to support networking and continuous information sharing**

**Organization of the activities**

- A small working group continues, **all are welcome to join!** Work is supported by the Scientific Advisory Board of the Finnish Food Research Foundation.

# Please contact and join us ☺

## Contact information


- Emilia Nordlund, VTT (emilia.nordlund@vtt.fi)
- Anu Kaukovirta, Luke (anu.kaukovirta@luke.fi)
- Mari Sandell, University of Helsinki (mari.sandell@helsinki.fi)
- Marleena Tanhuanpää, Finnish Food and Drink Industries' Federation (ETL) (marleena.tanhuanpaa@etl.fi)