



Global 
FOODTURE

Biomass valorisation

Thematic Workshop 3

8 December 2022



Organisers

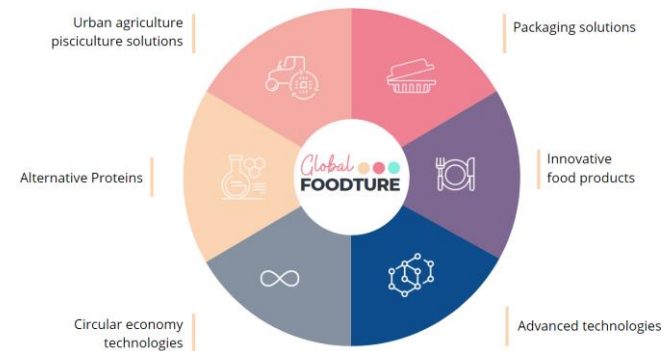


What is Global Foodture ?

- Global Foodture is a project designed to **boost the sustainable transition of the food system worldwide through collaboration and innovation.** Aiming to stimulate innovation collaboration between European SMEs and Asian organisations: Japan, Singapore, South-Korea and Thailand

Themes

- Agriculture - cultivation & support solutions
- Alternative proteins
- Sustainable packaging
- **Solutions to reduce food waste and circular economy**
- Health products, functional and personalised food



Activities

- 2022 - 2023: Online matchmakings, training programs, **thematic workshops** and onsite international missions to Thailand and Singapore



Consortium



Global Foodture is co-funded by the European Union's COSME Programme. The content of this document represents the views of the author only and is his/her sole responsibility; it cannot be considered to reflect the views of the European Commission and/or the European Innovation Council and SMEs Executive Agency (EISMEA) or any other body of the European Union. The European Commission and the Agency do not accept any responsibility for use that may be made of the information it contains.

Programme

09.00 Welcome & General Introduction of the workshop including the 2 Master Classes by the Moderator Elise Laporte

09.05 Presentation of the overall theme by Dr. Akkharawit Kanjana-opas, Expert, Thailand Science Research and Innovation

09.15 Presentation of Bio Base Asia Pilot Plant by Jan Brackx

09:25 Introduction to Digital Master Class 1 by Moderator Emma Sidgwick

09.30 Presentation by Juan Londono, cofounder of Yeasty

09.40 Presentation by Dr. Magnus Bergkvist, Head of Science and Research, Thai Union Group Pcl

09.50 Presentation by Eugene Wang, founder of Sophie's BioNutrients

10.00 Introduction to Master Class 2 by Moderator Emma Sidgwick

10:05 Presentation by Bart Kregersman, founder of Biolynx

10.15 Presentation by Olivier Paurd, head of Nbread Process

10.25 Presentation by Tina Rogge, COO / CTO Innovad Group

10.35 Q & A and reflection by Moderator Emma Sidgwick

10.50 Wrap-up & Closing – Moderator Elise Laporte





Bio Base Asia
Pilot Plant



Overview

- BBAPP introduction
- Bio economy in Thailand
- BBEPP
- BBAPP specifics



Bio Base Asia Pilot Plant

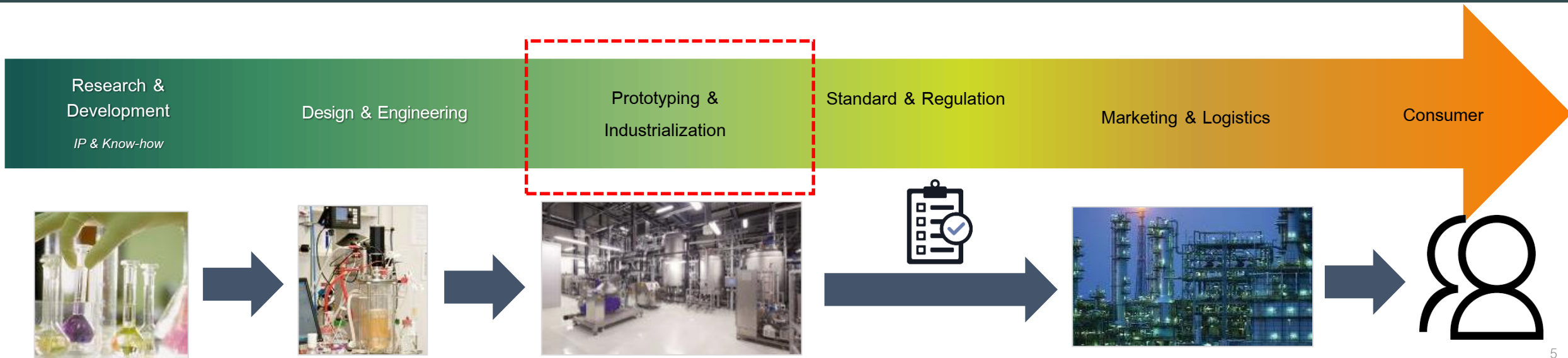
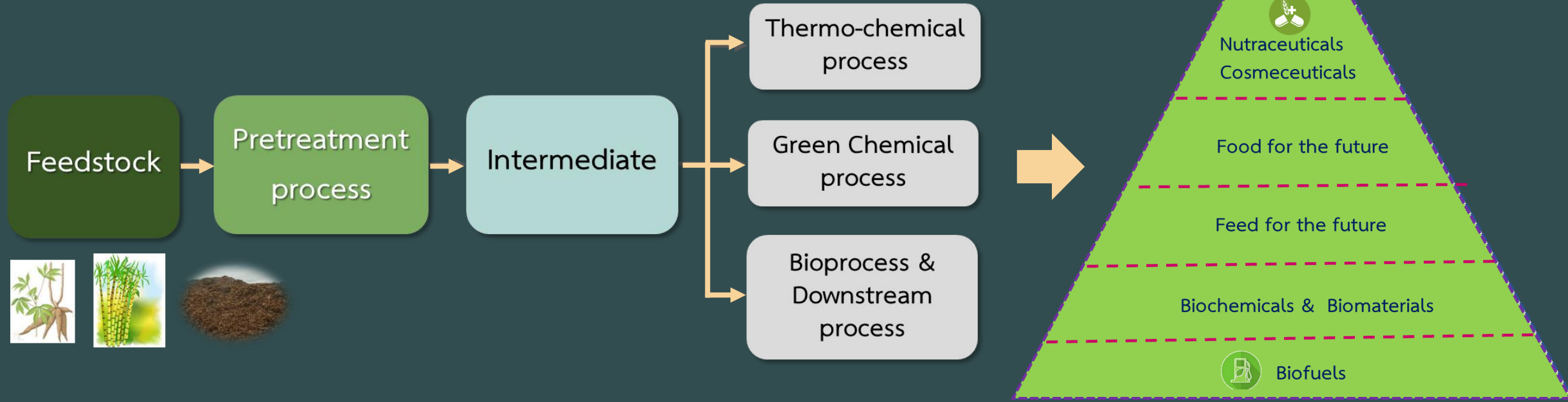
- Joint venture between NSTDA and BBEPP
 - NSTDA: National Science and Technology Development Agency of Thailand
 - BBEPP: Bio Base Europe Pilot Plant (Belgium)
- The first and biggest piloting and scale up facility in Asia.
- Open platform service provider with generic equipment.
- No industrial shareholders -> independent.



Bio economy in Thailand

- Thailand's economy has a strong agricultural sector, the engine of the economy.
- Over 40 Million ton of biomass/year. -> Turn "Waste to Wealth"
- Long term vision

Development of biorefinery industry



Bio Base Europe Pilot Plant

- **Key facts:**
 - Open access piloting facility
 - Service provider
 - No industrial shareholders
 - Independent
 - North Sea Port, Ghent, Belgium
- **Key figures**
 - Operational since 2010
 - 160 employees
 - >500 projects for >150 companies
 - 24 consortia based projects





BBAPP: infrastructure

- State of the art facilities and equipment organised by NSTDA
 - Pre treatment of bio mass
 - Mechanical / Thermo chemical / Bio catalytic
 - Bio processes
 - Fermentation / green chemistry / Biocatalysis
 - Downstream purification
 - Filtration / Evaporation / Drying / Homogenisation
 - Labs for preparation and analysis
 - Warehousing and material handling at -20°C and 4°C



BBAPP: operational management

- Knowhow and management systems organised by BBEPP
- Proven project procedures:
 - detailed batch records
 - quality management: ISO / FDA /
- Full confidentiality.
- To be recognised as official Thai R&D provider enabling tax breaks for Thai companies

-> Ready to scale up for customers worldwide by October 2024

Thank you



Location:

EECi,

An ecosystem to translate research and innovation into economic development.



Global 
FOODTURE

Food and ingredient companies valorising side streams towards value added products

Thematic Workshop 3 - Masterclass 1

8 December 2022





YEASTY

**Global Foodture
Biomass Valorization**

-
08/12/2022

A renewed protein source for the food industry

We have created a sustainable and protein-rich super-ingredient by leveraging a renowned but yet unused industrial by-product: spent brewer's yeast.

WE DEVELOP THE PERFECT PRODUCT



FOR BOTH

FOOD-PROCESSING INDUSTRIES AND THE END CONSUMERS.



The **brewing** process biomass to be valorized



Spent Grain

85%*** of the brewing industry total waste

- Cereal by-product
- Rich in fiber, protein
- **Applications:** Food, Fertilizers, Ceramics
- **Barriers** for Food: hard to formulate, stability



1.86 billion* hectoliters produced worldwide in 2021

Two major by-products from the brewing industry



Yeast

2.1 million** tons/year for the 3 major beer-producing countries

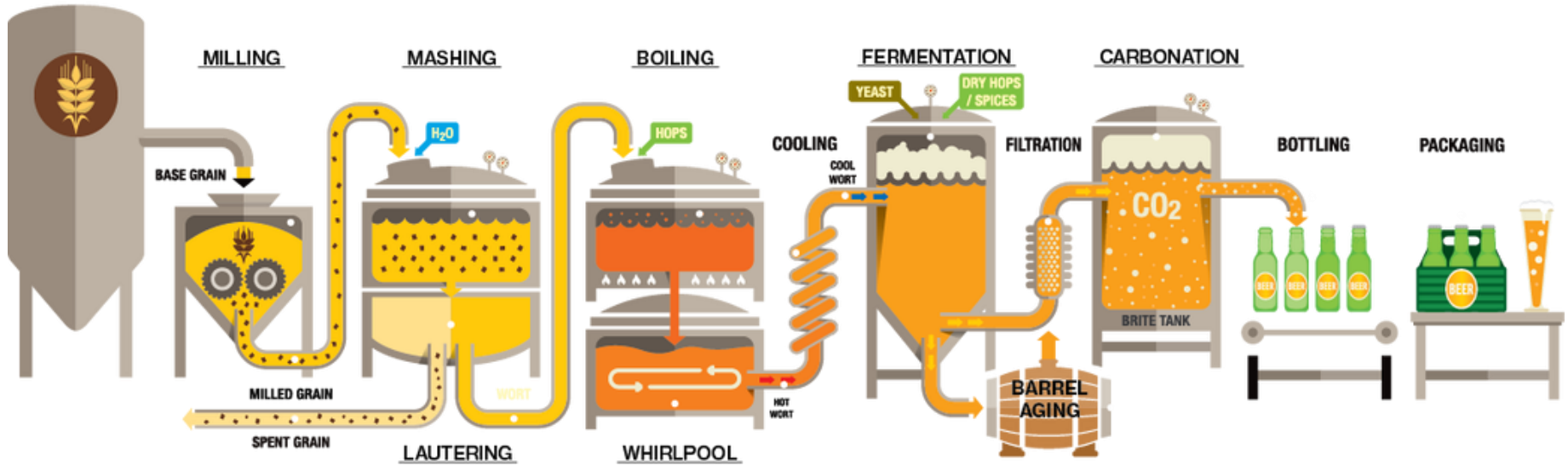
- Micro-organism by-product
- Rich in protein, fiber and micronutrients
- **Applications:** Feed, Yeast extraction, Methanisation
- **Barriers** for Food: strong bitterness

*Source: Statista

**Source: A low-cost brewery waste as a carbon source in bio-surfactant production, 2021

***Source: Mussatto, Solange I (May 2014)

The bitterness problem for yeast upcycling

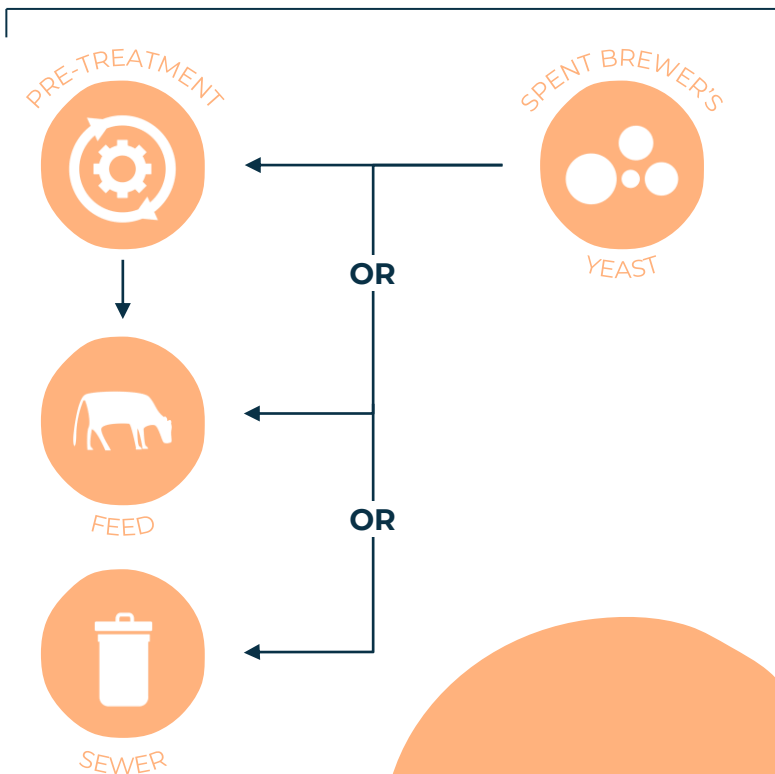


Where does the bitterness come from?


Hops liberate humulones molecules during the brewing process that adsorb to the yeast walls

We unburden the breweries from a costly **pain**

Breweries



=



2.1 M tons of yeast potential/year for the 3 major beer-producing countries

High **environmental** cost.
High **economical** cost.

We have developed a **unique** and highly scalable process

Breweries

PRE-TREATMENT



FEED



SEWER

OR

OR

SPENT BREWER'S



YEAST

2.1 M tons of yeast potential/year for the 3 major beer-producing countries

High environmental cost.
High economical cost.

Yeasty

DEBITTERING



PROCESS

CONCENTRATION



DRYING

PACKAGING



Standard processes and machineries.
Strong international replicability.
beer is everywhere!

An **innovative** process

- > Can debitter any kind of yeast
- > Can be used for organic production
- > Patenting in process

Our process is confidential

Our **circular** business model creates a win-win for all players



We unburden the breweries from their unused yeast at a low price



YEASTY

We debitter the yeast through
our **unique process**



We offer a competitive and complete super-ingredient

Our **sustainable super-flour** is set with all the ingredients for success

TASTY

- Naturally rich in a “meaty” and savoury umami taste
- Good social acceptance
- Vegan product, for all diets

NUTRITIOUS

- High protein content of 50 to 60%
- Complete amino acid profile and PDCAAS of 1.0
- Also a great source of fibers, vitamins and minerals



AFFORDABLE

- A highly competitive price
- Scalable industrial processes
- Strong international replicability

SUSTAINABLE

- Main ingredients circularly sourced
- Minimal processing
- A complete alternative to animal proteins



PLANT-BASED PREPARATIONS



MEAT-ANALOGS

Our natural and complete yeast super-flour
has many potential applications



MEDICAL NUTRITION



PETFOOD



SPORTS NUTRITION



PANIFICATION

Our delicious applications have **already started to convince!**

YEASTY VEGGIE PATTIES



20% protein

PROTEIN-RICH CRACKERS



20% protein

PROTEIN-RICH PASTA



25% protein

75%

Of testers prefer our
20% yeast enriched
pasta over control!

« It has delicious
cheesy notes »

Ingredients

- Yeasty's flour 20%
- Wheat Semolina
 - Water

And that's all!

« I feel like a creamy
texture, and a taste
similar to carbonara »



YEASTY

**Producing a sustainable protein for the planet,
Providing an alternative protein for all.**

Want to be part of the next food shift?

Contact us :
juan.londono@yeastyfood.fr
06.28.54.29.27





Seafood Side-Stream Valorization

- Bio Circular Green Economy-



Magnus Bergkvist, Ph.D.

Head of Science & Research
Global Innovation Center
Thai Union Group PCL.

December 08, 2022

Thai Union Group



A **Global Seafood Leader** committed to seafood expertise and innovation.

Ambitious growth plans rooted in commitment to Sustainability and Forward-Looking Innovations.

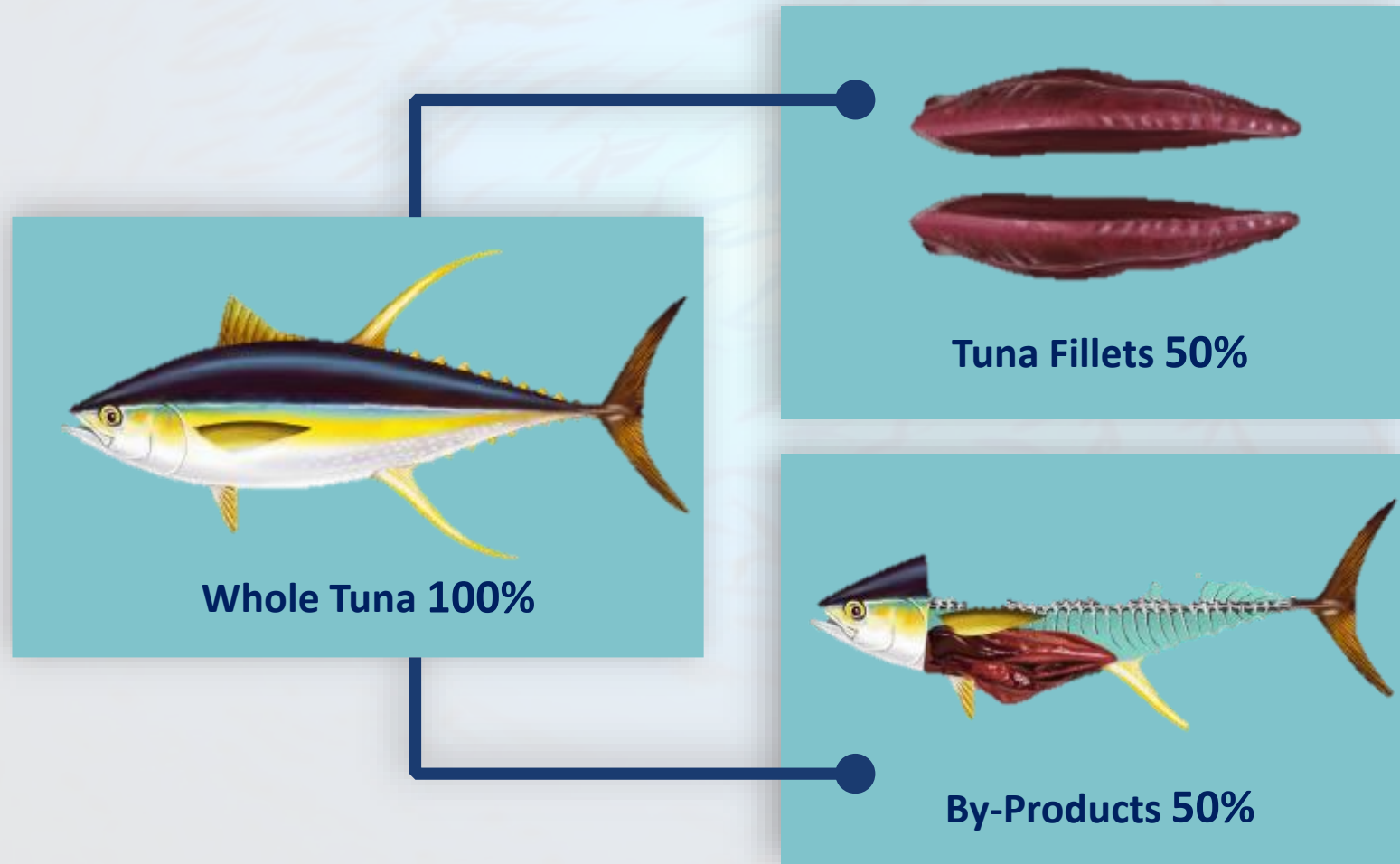
OUR MISSION

To be the seafood industry's leading agent of change, making a real positive difference to our consumers, our customers and the way the category is managed.

Ranked No. 1 on DJSI for Food Products Industry (2019 and 2018)



World Tuna Processing

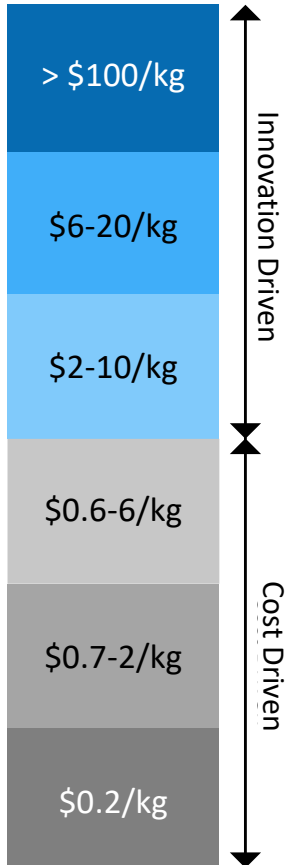


Half of Tuna is by-product

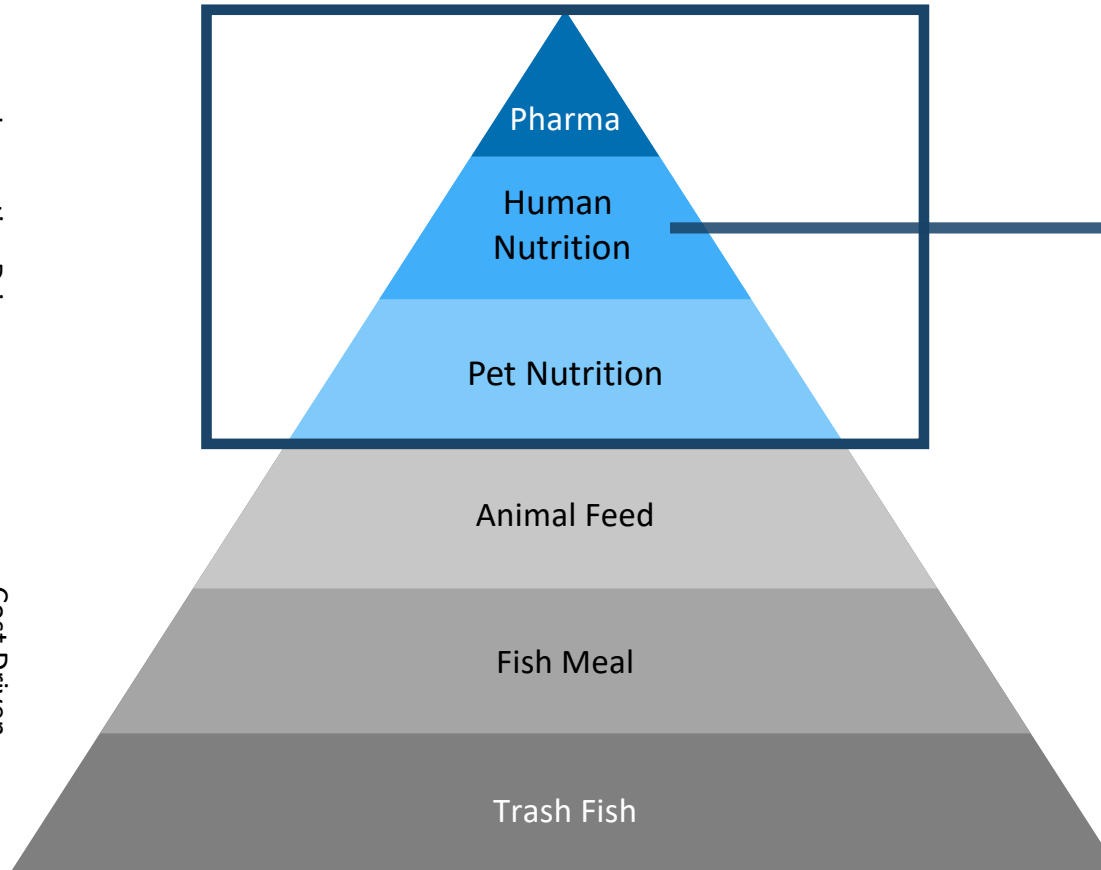
Only 40-60% of the fish is used in the primary product

Tuna Co-product Valorization at Thai Union

Indicative prices



Market approach

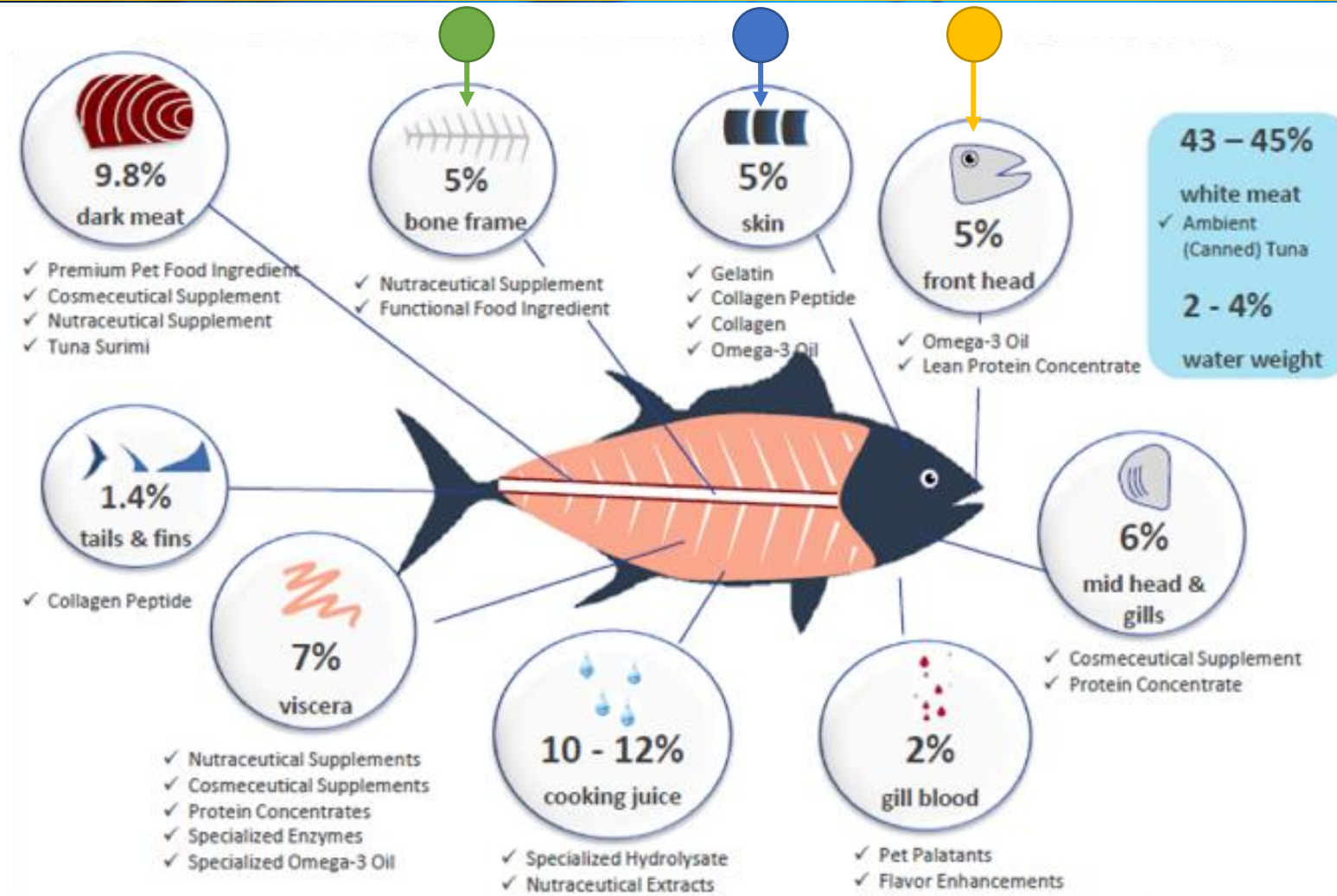


Human Nutrition

Rapid Growth in the Area of Sport Nutrition and Food Supplements.

The Top Tier of Pharma Requires Investment in Advanced Technology but Offers the Highest Return for Quality By-Products.

Co-Products of Tuna (Thai Union)

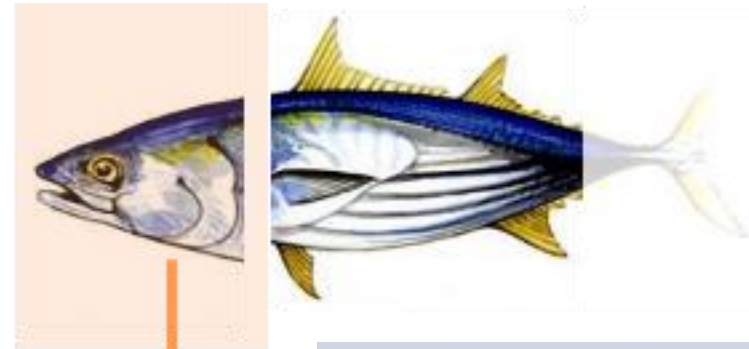
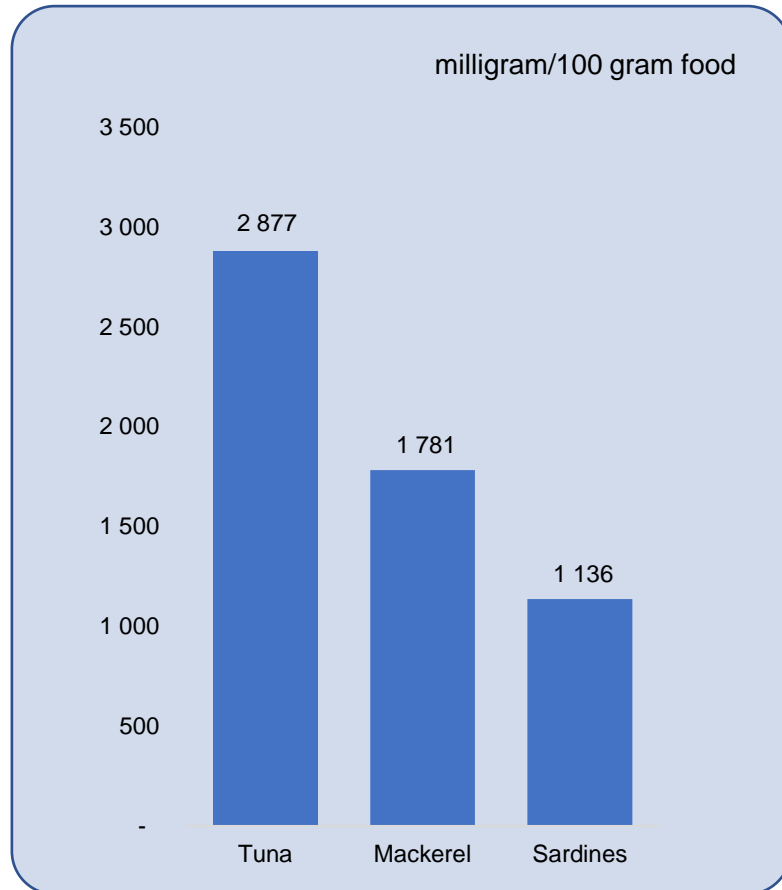


**~130,000
Metric Tons
of Tuna
Processed
per Year**

Tuna Co-product Valorization

Tuna Fish Oil

Comparison of DHA from Sea Fish



Tuna Skin and Head are
Good Source of EPA and DHA

Excellent
Nutritional
Benefits



- Depression
- Impact of Aging
- Risk of Breast Cancer
- Obesity
- Inflammation
- CVD & Hypertension
- Diabetes

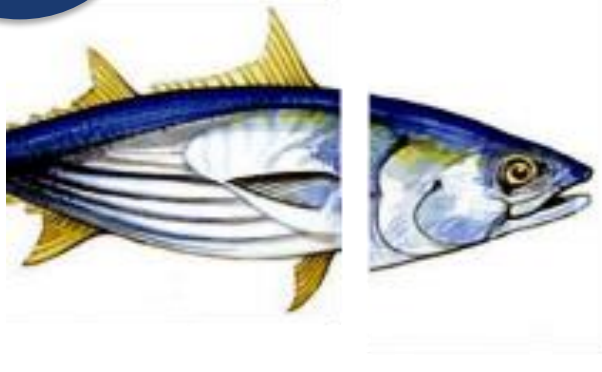


- Heart Health
- Maternal Health
- Kidney Health
- Brain Health & Development
- Immunity
- Fertility

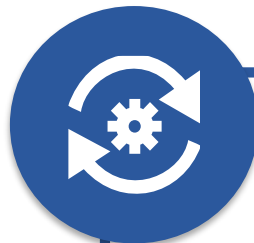
Tuna Co-product Valorization

Tuna Fish Oil

Challenges



**Different RM Require
Different Handling Practices**



**Standardize and Control
Quality throughout
Supply Chain**



**Better Quality but
Lower Industrial Yield**

Tuna Co-product Valorization

Tuna Fish Oil

UniQ[®]DHA

Crude white tuna oil

Refined tuna oil

Traceable. Safe. Healthy.

Ideal for infant nutrition, dietary supplements and nutritional foods, where high DHA and low EPA are desired.



Optimized natural DHA content



Our neutral tasting refined tuna oil offers an ideal ingredient for infant nutrition since refined tuna oil is one of the richest known sources of Omega-3 fatty acid DHA, playing a central role in infant brain and nervous system development. DHA is an Omega-3 fatty-acid that can be obtained via breast feeding or DHA-enriched infant formula

Processed from high quality crude white tuna oil



Using only the highest quality crude white tuna oil sourced from our integrated supply chain with our own tuna oil extraction plants in Thailand, Ghana or The Seychelles, we deliver a clear and light tuna oil with high levels of natural DHA



Tuna Co-product Valorization

Tuna Calcium

The Science

- Tuna Bone Powder is Mainly **Hydroxyapatite** $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$
- The same form as Calcium found in Human Bone Structure
- Contains - Collagen, Protein and Minerals other than Calcium.

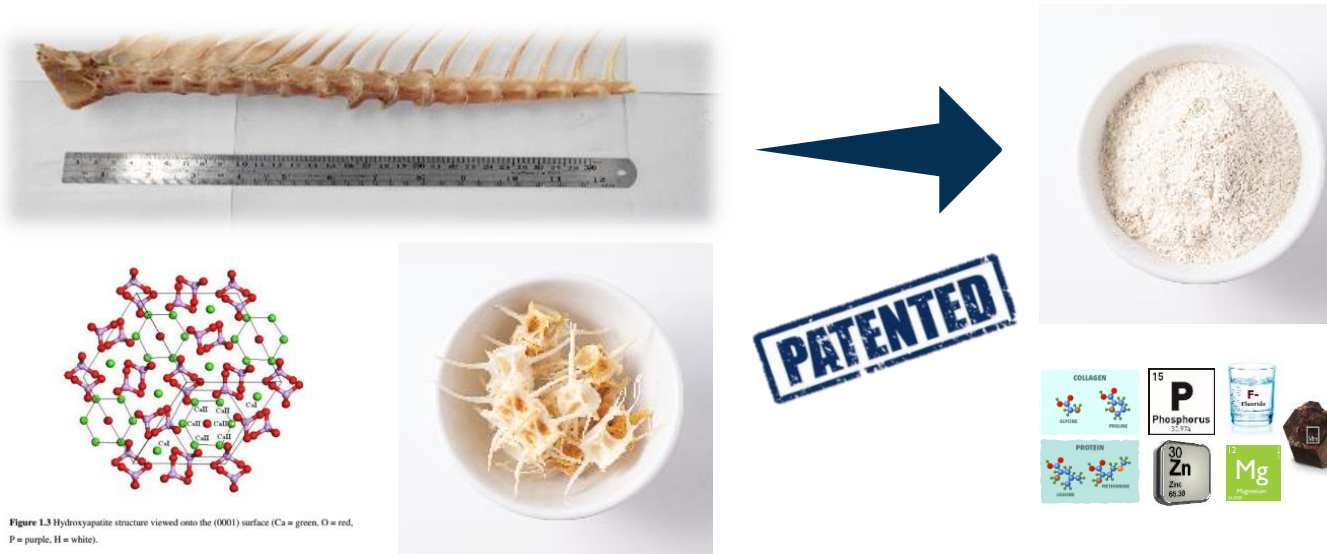
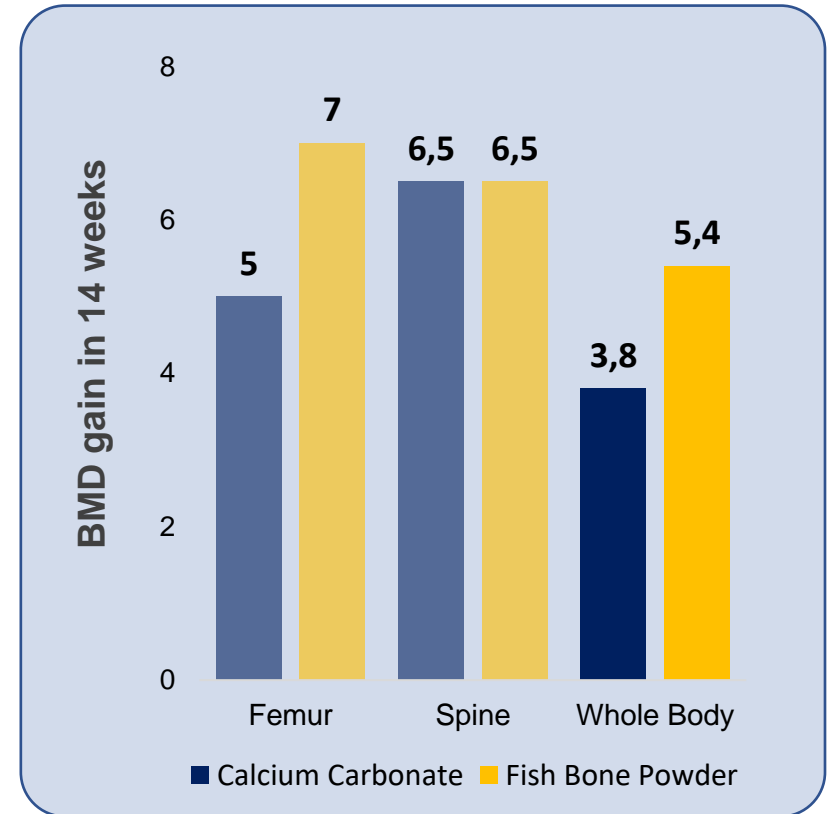


Figure 1.3 Hydroxyapatite structure viewed onto the (0001) surface (Ca = green, O = red, P = purple, H = white).



Research Show Tuna Bone Increases Bone Mineral Density in Lactating Mothers and in Offspring (rats)

Tuna Co-product Valorization

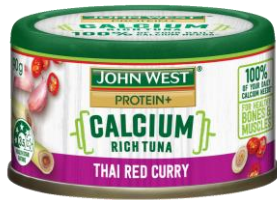
Tuna Calcium

Value creation from Tuna Calcium

- A Good Calcium Source / Ingredient
- Shelf Stable Tuna / Seafoods Products
- Healthier Choice Product with No Effect on Overall Taste

Calcium Enriched Tuna was Developed by TU to Provide the Natural Goodness of Tuna with Tuna Calcium for Strong Bones

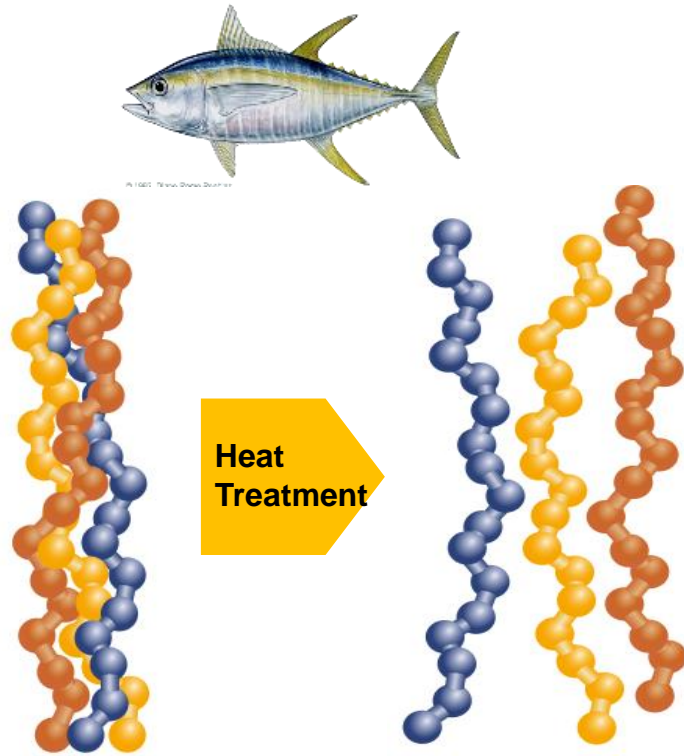
“Fish with all the nutrition left in”



Calcium Enriched Tuna

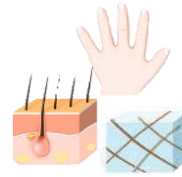
Tuna Co-product Valorization

Collagen from Skin



Collagen

Enzyme



Enzyme



Enzyme



Enzyme

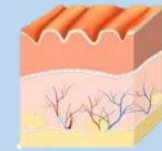


Collagen peptides

Highly valuable **protein source** with excellent functionality



Optimized stimulation of fibroblasts in **skin**



Optimized stimulation of chondrocytes in **joint cartilage**



Optimized stimulation of osteoblast in **bones**



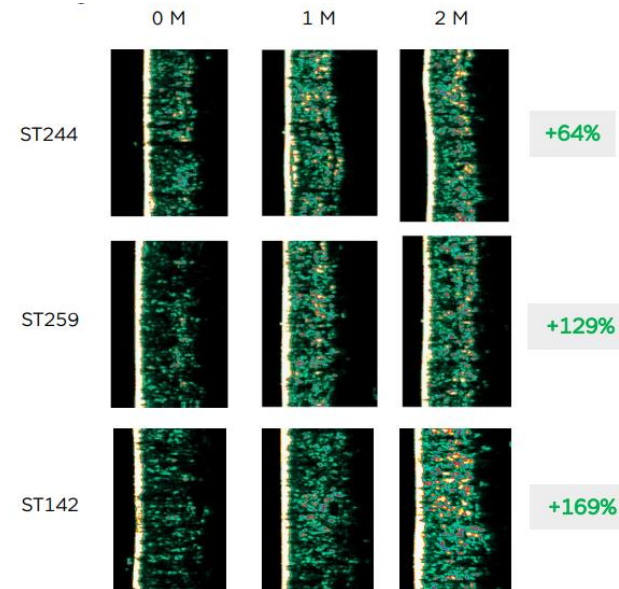
Tuna Co-product Valorization

Collagen from Skin

Skin health

18 Participants : 4 Males, 14 Females : Age 35-75 Yr
Consumption : 2 sachets/day, @Day 0, 1 and 2 Month

Result shows significant increasing of 1) Skin Elasticity, 2) Skin Moisture and 3) Skin Density after consumption for 1 and 2 Month



- Thank you -



SOPHIE'S
BIONUTRIENTS

Sustainable Microalgae Protein & Biomass Valorisation Technologies

Eugene Wang
Co-Founder & CEO



Maximum Protein Minimum Footprint

We want to make it differently:



The flour NOW in the market:

1. Dark Color
2. Fishy Smell
3. Expensive Price



Our flour:

1. Color Neutral
2. Flavor Neutral
3. Cost Competitive

It has to do with Singapore





Why Food Waste?

Reduced Cost

Circular
Economy



Spent grains
Wastes from breweries



Okara
Wastes from tofu makers



Molasses
Wastes from sugar refineries



Rice bran & Sake Lee
Wastes from rice processors



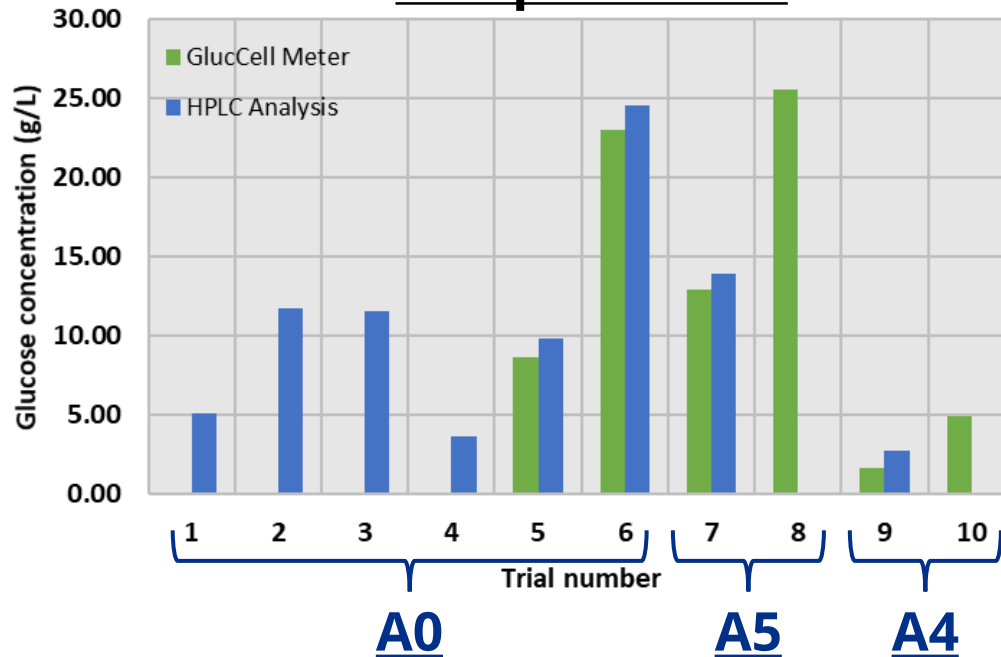
Ugly dates



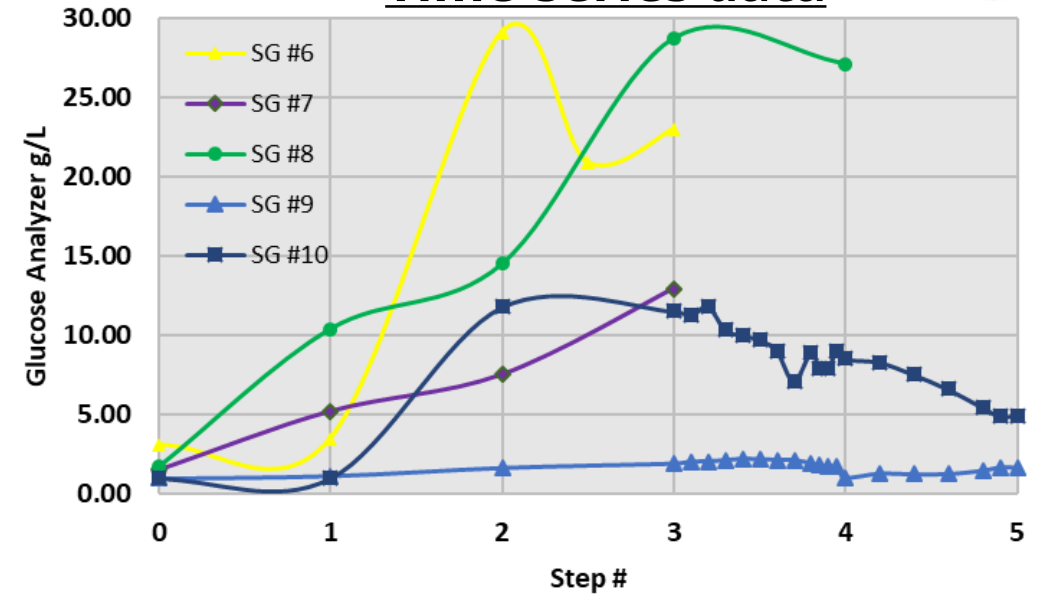
- Variations in side streams quality
- Variations in production quality
- PH value of the side streams before and after processing is another headache
- Availability (quantity & time)
- Shipping and other logistics
- Side streams from the valorisation process
- CMOs usually are not enthusiastic about the ideas

Spent grain enzyme hydrolysis

End-point data



Time-series data

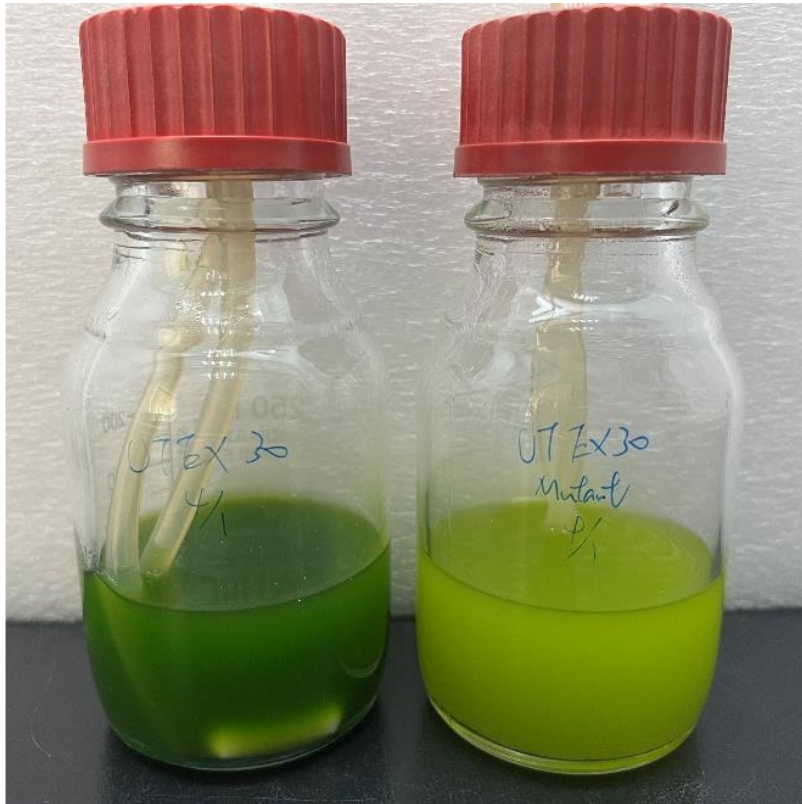


Differences due to raw material storage/drying conditions?



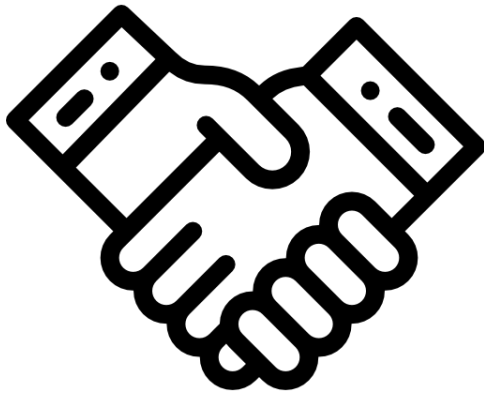
Use bag A1 that was frozen from the beginning and is in perfect condition.

Example of color variations





We ALL need to work together to
make things happen



Our Mission

Decoupling protein supply from
arable land & reducing the
environmental footprint

Thank you!!

Eugene Y. Wang
Co-Founder & CEO

WhatsApp +1-714-616-9351
eugene@sophiesbionutrients.com





Technology providers with innovate methods for the valorisation of various agri-food side streams

Thematic Workshop 3 - Masterclass 2

8 December 2022





Global Foodture workshop Biomass valorization



Biolynx

- ▶ Microbial processes and products
 - ▶ Biolynx develops unique microbial processes and products in cooperation with clients/partners
 - ▶ Developments:
 - ▶ Food/Food
 - ▶ Environment
 - ▶ (Bio-) chemicals





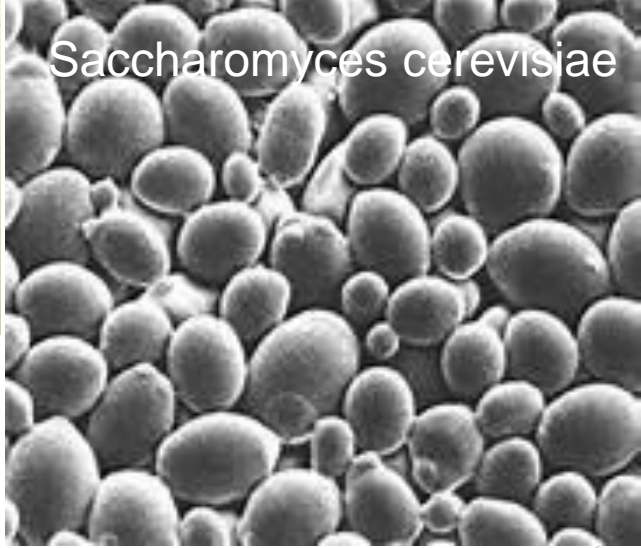
Fungi



Aspergillus oryzae



Pleurotus ostreatus



Saccharomyces cerevisiae



Why do we need Fungi?





The team



Bart
Founder



Eva
Technologist



Ranie
Technologist



Sara
Lab
technician



Lennert
PhD candidate



The Lab



- ▶ 8 fermenters: 250mL-500mL
- ▶ 8 fermenters: 1-20L
- ▶ Incubators
- ▶ Shaking incubator
- ▶ > 150 strains in stock



Biolynx: Projects



Korallion Bio

BOLDER FOODS



TAKE AIR | LABS®



AGENTSCHAP
INNOVEREN &
ONDERNEMEN



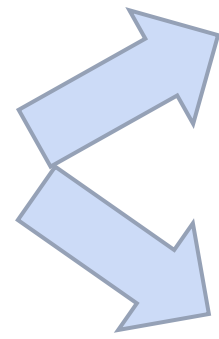
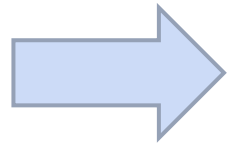
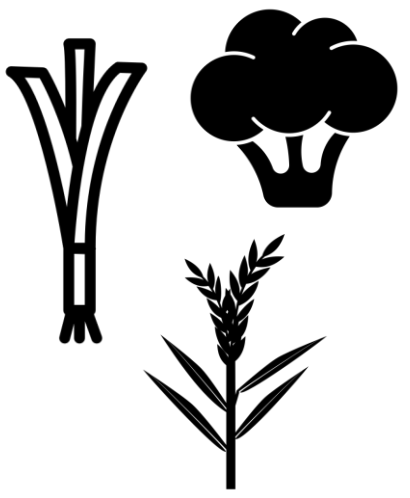
Vlaanderen
is ondernemen



DEPARTEMENT
LANDBOUW
& VISSERIJ

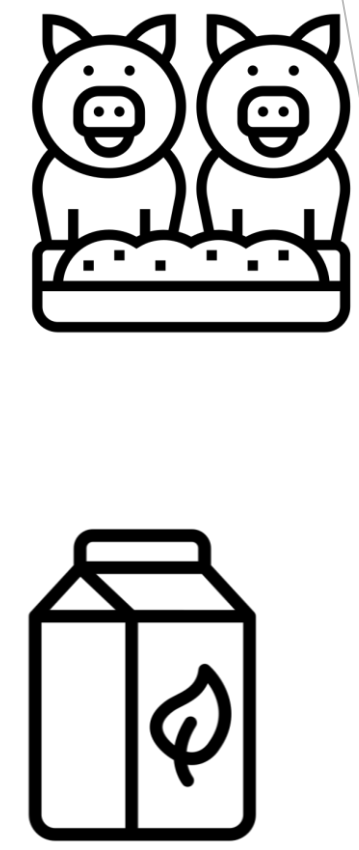
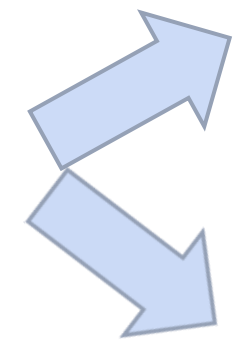
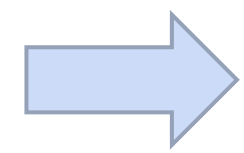


Profungi





Bactostar





Biolynx: Plant-based proteins

- ▶ Mycoprotein
- ▶ With partner; 10.000 ton
 - ▶ April 2023
- ▶ NaPlaSol
 - ▶ Total investment
 - ▶ 35 Meuro
 - ▶ 25 FTE





BIOLYNX
SHAPING FUTURE PROCESSES

Thank you!

NBread PROCESS

COMMITTED TO THE FOOD TRANSITION
FOR A GREEDY, HEALTHY, AND ECO-
RESPONSIBLE WORLD

GLOBAL FOODTURE
Décembre 2022



An alarming observation in a world in transition

30%

of food is lost at
different stages of
the production chain

11%

of fruit & vegetables
are not valued by
French producers =
600Kt/year

FIDA - OMS

FAO



MISSION

Optimising agricultural resources
within the territories and
preserve their benefits

PROJET

Valorisation of Coproduct
all over the world

JOB

Industrial franchiser



CONSUMERS ARE ASKING

SNACKING a growth market

16,7 G €



+10%/y



Agro Média

Market will



85%

of consumers in 12 countries say they eat at least one snack for food and one for pleasure every day

62%

even prefer to have several snacks rather than meals, millennials (69%)
Generation Z (75%)

Vigie Alimentation study 2022

A growing trend:
Snacks from upcycling

NBREAD – SIMPLE SOLUTION

Example of recovery of noble vegetal waste



70%

Downgraded tomatoes



Legums

25%

Piece of taste

5%



Soft technologie



Innovation



Process Nbread



New textures
Improved taste
Sustainability
New value propositions
New markets
50% margin

NBREAD – SIMPLE SOLUTION

Example of recovery of noble fish waste



60%



Soft technologie



Innovation

Brown fish muscles



Rice
25%

Piece of taste
15%



Process Nbread



New textures
Improved taste
Sustainability
New value propositions
New markets
70% margin

PROJECT STRENGTHS

Removing the obstacles to the development of A.I.



Team
Jobs



innovating
Technologie



I.A.A needs
responses



Olivier Paurd
CEO

Laure Villacèque
CSO

Stéphane Mauzey
CPO

7 years of know-how
3 patents issued
Scalable
Transferable



Low energy cost



Creating margins



Reduction
carbon impact



Green Tech



Market access

R&D
PRODUCTION TESTS
TRANSFER SUPPORT
=
INDUSTRIAL FRANCHISE

BUSINESS MODELE B to B

Partners



Activities Ressources



Values propositions

50% Gross margins

Fast ROI

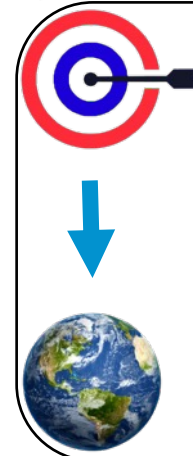
Low energy costs

Low competition

Catalogue offer

Security and flexibility of
the technology

Large-scale resource
optimisation



Clients

I.A.A

Nutrition companies

Sales

Services R&D

productions tests

Licences - Exclusivities





NBread
PROCESS

Thanks for your attention

Olivier PAURD



NBREAD@NBREAD-PROCESS.COM



06.48.06.86.50

3 Boulevard de L'industrie 41700 Contres



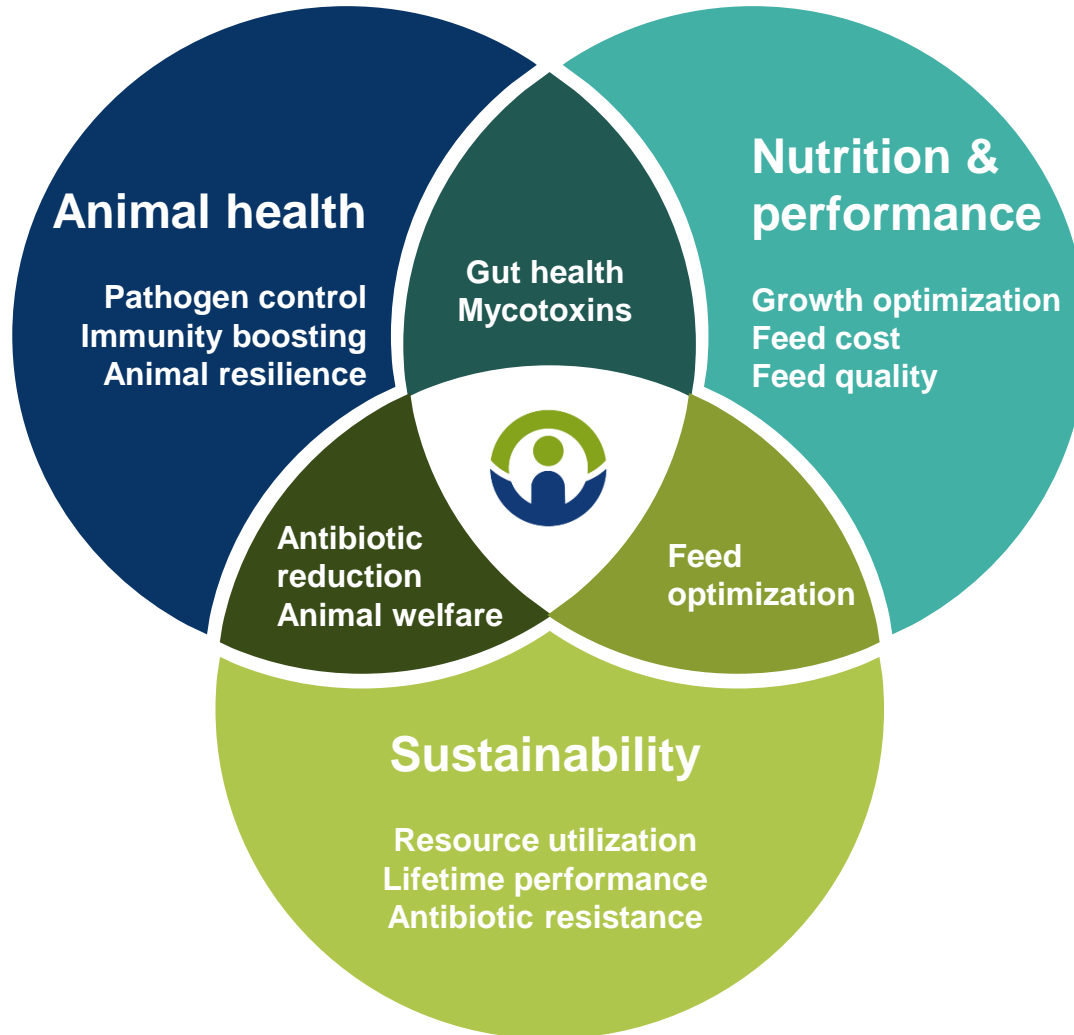


Welcome to



innovad[®]
CREATE TRUST

GROUP



**Plant-based,
natural ingredients**

Primary Producer

Expertise

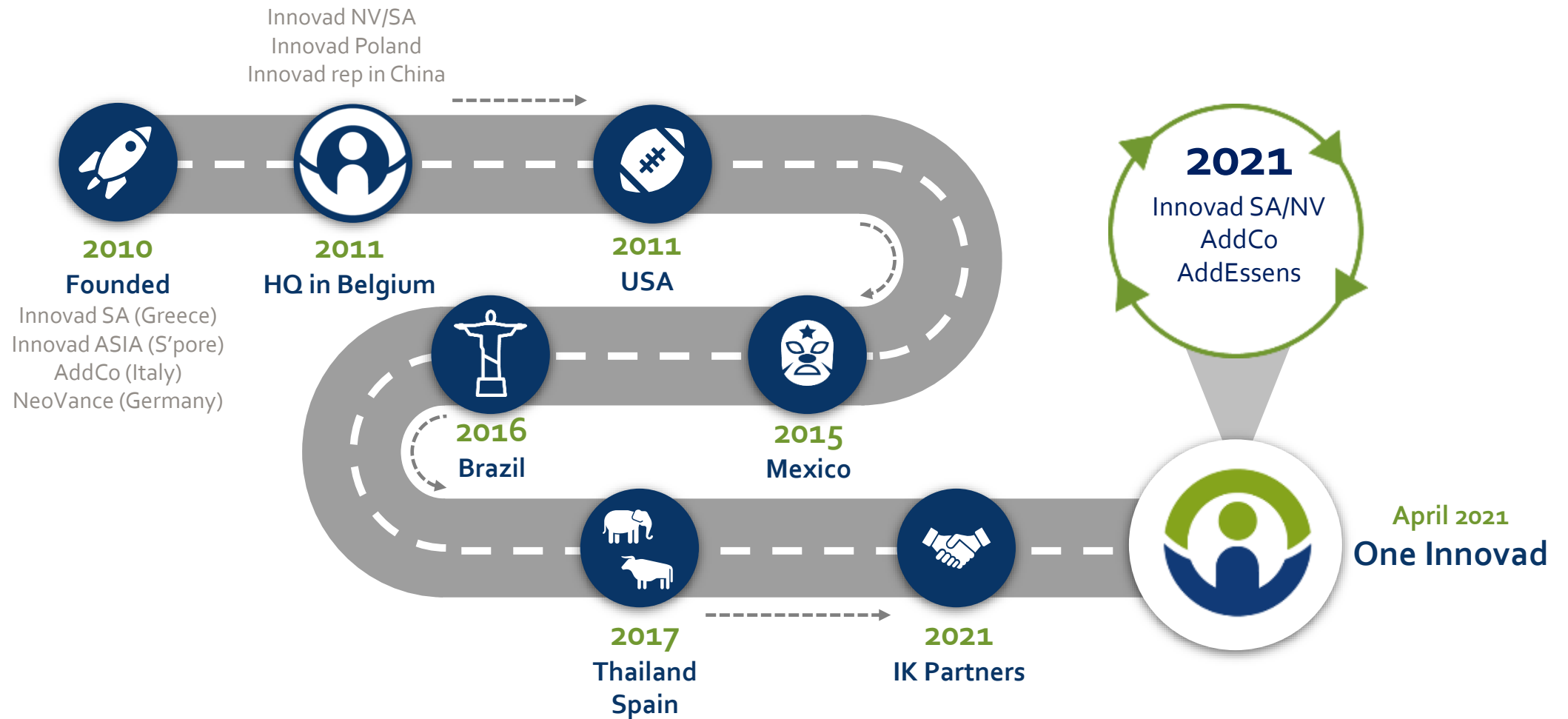
Creativity - Innovation

Sustainability

'Circular' Resources



Our journey so far



Primary manufacturer



Dedicated specific manufacturing & technology centers

FEED ADDITIVES & NUTRACEUTICALS



NATURAL PIGMENTS



NATURAL ANTI-OXIDANTS & ESSENTIAL OILS



Focused on circular economy

Juice Manufacturer



Focus on red/blue berries

Rich in

- Poly Unsaturated Fatty Acids (PUFA's)
- Anti-oxidants
- Pro-anthocyanides
- Vitamins, minerals & trace elements

Organic where possible

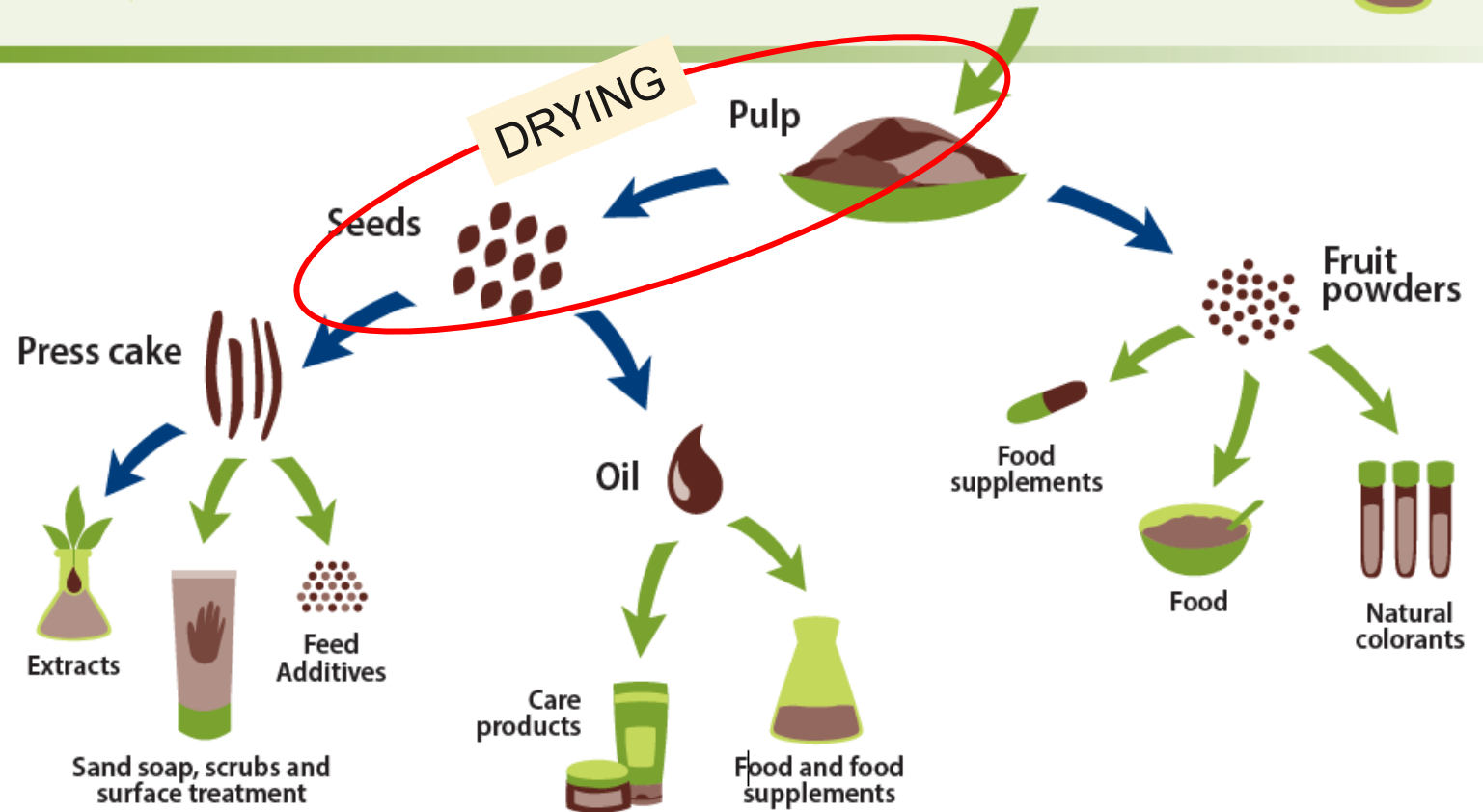
Focused on circular economy

Juice Manufacturer

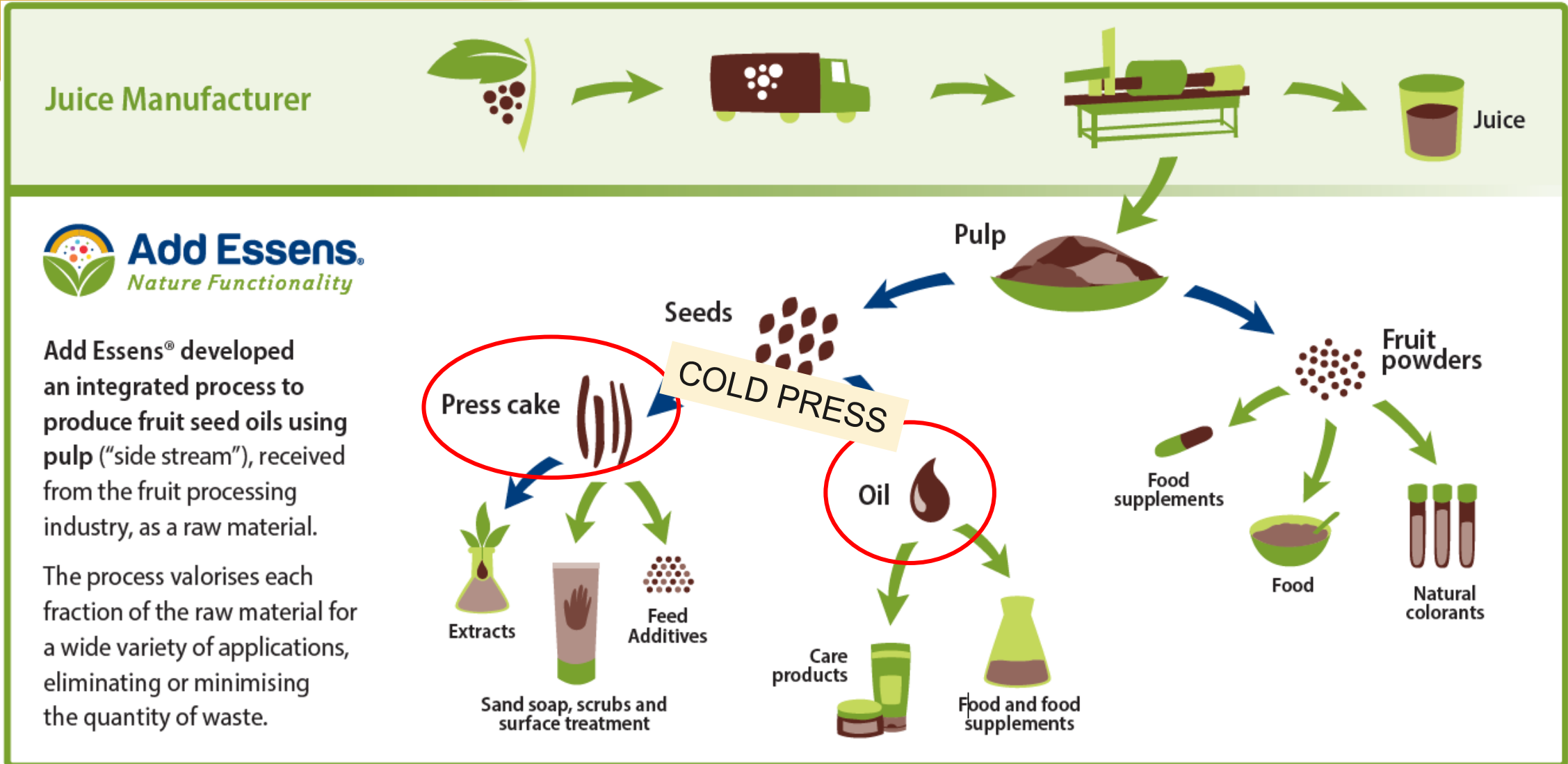


Add Essens® developed an integrated process to produce fruit seed oils using pulp (“side stream”), received from the fruit processing industry, as a raw material.

The process valorises each fraction of the raw material for a wide variety of applications, eliminating or minimising the quantity of waste.



Focused on circular economy



Add Essens® developed an integrated process to produce fruit seed oils using pulp ("side stream"), received from the fruit processing industry, as a raw material.

The process valorises each fraction of the raw material for a wide variety of applications, eliminating or minimising the quantity of waste.

Extraction: depletion of raw materials

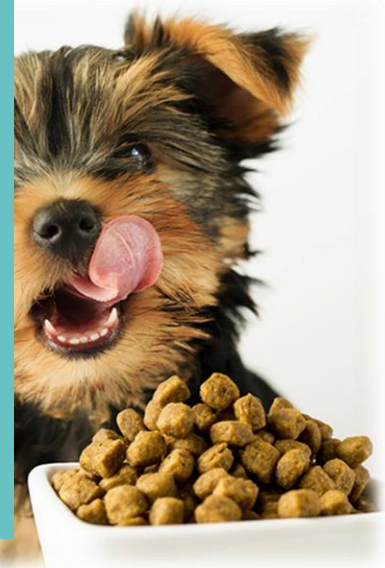
Combination of

- **Supercritical extraction:** lipophilics
- **Water-ethanol extraction:** hydrophilics





Add4tis: nutritional concept for pet food market





Add4tis is based on red/blue berries

- High in vitamin C
- Manganese
- Folate (vitamin B9)
- Potassium
- Powerful antioxidant

Strawberry



- Rich in vitamin C and K
- High antioxidant power
- Unique anthocyanins
- Distinct retinal and cognitive effects

Blueberry



- Vitamin 'superstar'
- High in anthocyanins & phenolic substances
- Vitamin C

Blackcurrant





Optimal performance • Specialised solutions • Circular production

Thank you !

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Global FOODTURE

Q&A Session : Any questions ?

Thematic Workshop 3

8 December 2022



Wrap Up & Closing



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Next
Event!

FOURTH WORKSHOP JANUARY

About the Workshop

As global population is on the rise, the need of food and especially protein-rich meals is increasing every day. But the current way of production is taking a heavy burden on our planet.

More environmental production methods are being explored that take up less land, consume less water and emit less GHG.

Next to plant-based proteins, research goes further looking at cell-based proteins, produced in the lab or single cell proteins, fermenting microbial organisms.

TOPICS TO BE COVERED

- Single Cell-based protein revolution
- Microbial protein and cultured meat production

19th January 2023 | 09:00 - 11:00h



Alternative
Proteins

THE FUTURE OF PROTEINS

Global
FOODTURE



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of the European Union



Please check the catalogue for all the
Thematic Workshops



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INTERNATIONAL TRAINING PROGRAM

DEDICATED MATCHMAKING

30 November	2022	Thailand
01. February	2023	South Korea
05. April	2023	Thailand
27. September	2023	Japan



Matchmaking instructions

- Fill out your profile to boost your visibility
- Fill in the marketplace
- Browse through the participants and/or marketplace
- Find relevant meeting partners
- Request meeting or be booked for meetings
- Schedule meeting for the dedicated event (1st February)
- Prepare and have the meeting



Thank you and see you around
For more events click [here](#)

