

BRIDGE2FOOD
EUROPE

9-11 June
Copenhagen
Denmark

SOUFFLET



MALT



MALTING UNLEASHED
Optimizing Germination to Craft
Protein and Fiber Solutions for
Healthier Ingredients

Dr. Jean-Charles MOTTE
Head of Innovation

WE'RE THE
WORLD'S
N^o1
MALTSTER

OUR VISION

UNLEASH THE POWER OF MALT

- 3.7 MT
production capacity
- 2,300
employees
- 250+
types of malt
- 40
malthouses
- 20
countries
- 8
International brands
- 5
continents



Seed germination



GERMINATION



Process

Beginning of seed growth that converts starches into fermentable sugars and activates essential enzymes



Conditions

Raw material management, humidity, temperature, time, aeration, mixing



Benefits

Increased enzyme activity, enhanced nutrient bioavailability, improves the taste



MAIN EFFECTS



Enhances nutritional value



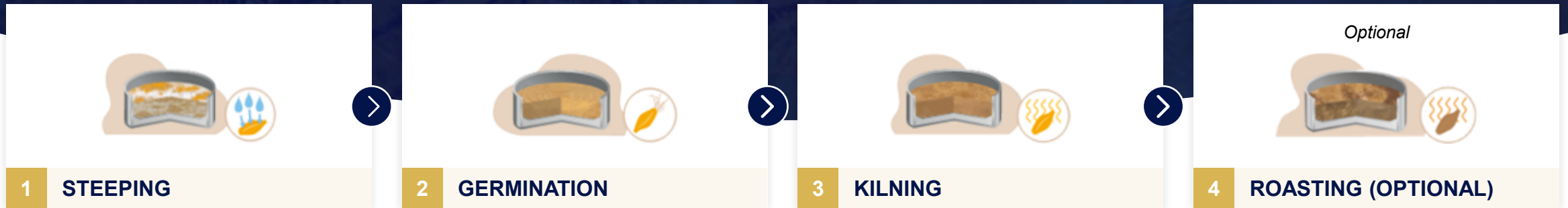
Optimizes food properties



New organoleptic experiences

What is the Malting process ?

ACTIVATING THE SEED'S BIOCHEMICAL POTENTIAL FOR PRECISE BIOTRANSFORMATION

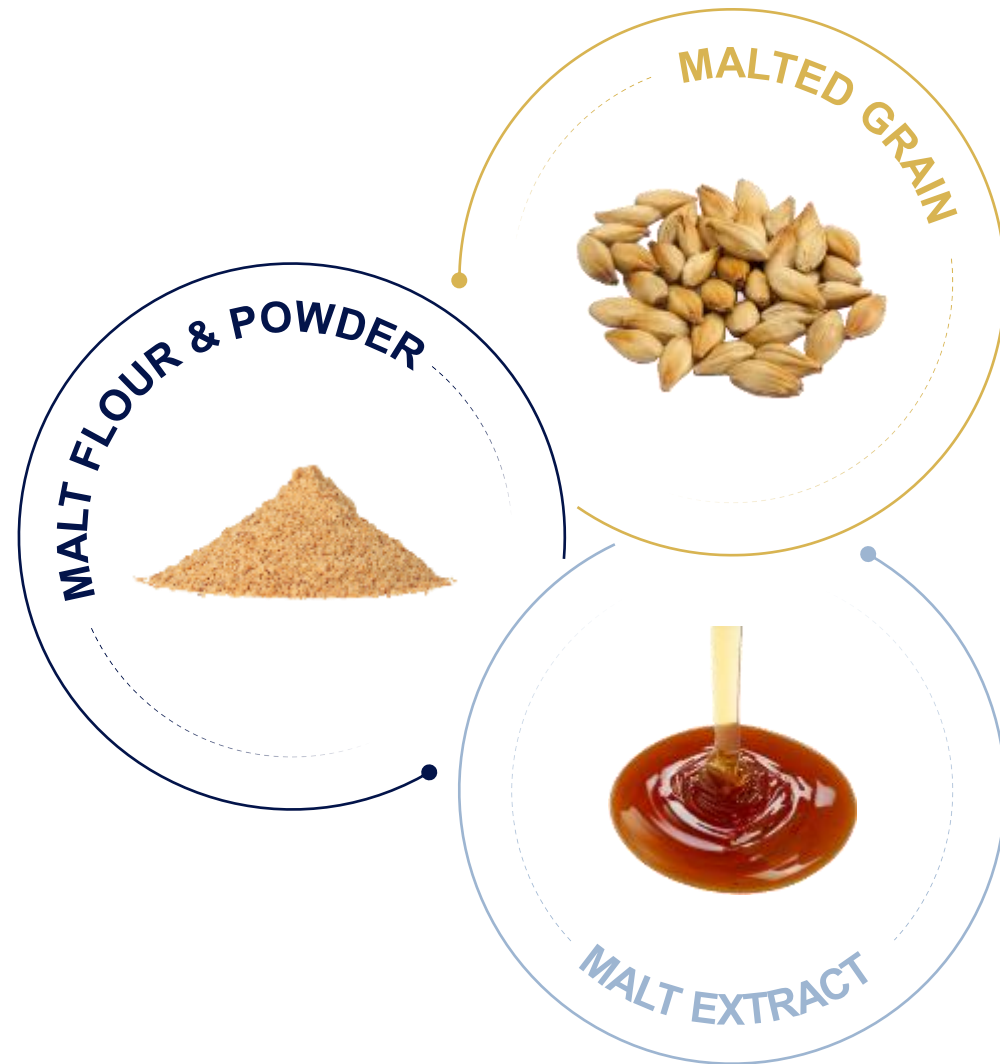




WHAT IS THE MALTSTER'S EXPERTISE?



The malt ingredients landscape



All these **well known ingredients** on the market have been developed based on malts optimized for brewing



Our commitment is to develop the **ideal malt ingredient application for your needs**



**What if we design malt
specifically for the
ingredients market?**



Grains that we can malt



Classical cereals

- Barley
- Wheat



Specific production

- Buckwheat
- Rice
- Oat



Under development

- Pulses
- Oilseeds



From specifications for beer

Color	Yield
Sugar Profile	Low beta-glucans
Low protein	



Optimal ingredients for beer production

We are working on them developing optimal ingredients for other new adjacent applications



To ingredients specifications

Allergen free	High Protein	High Fibers	Texture
Digestibility	Solubility	Form factor	Warm notes
Yield	Sugar Profile		

Cooking know-hows (1/3) - Houmous Recipe



↓ **Malting** ↓



1. The Overnight Soak

Cover 1 cup of dried chickpeas with 3 inches of cold water.

Leave overnight (chickpeas will triple in size).



2. The Baking Soda Boil

Boil soaked chickpeas with 1 tsp of baking soda.

Simmer until completely tender and easy to smash.



3. Drain and Cool Slightly

Drain chickpeas and reserve ½ cup of cooking liquid (aquafaba).

Let cool slightly before blending.



4. Build the Emulsion

Blend lemon juice, garlic, salt, and tahini until whipped.

Add 2 cups of the warm, cooked chickpeas and cumin.



5. The Final Whirl

Blend for 3–4 minutes until silky.

Stream in 2–3 tbsp of warm cooking liquid to thin.

Cooking know-hows (2/3) - Chili Con Carne Recipe



↓ **Malting** ↓



1. The Overnight Soak

Cover dried kidney beans with three times their volume of cold water.

Leave overnight on the counter to triple in size and soften.

2. The Simmering Boil

Drain the soaked beans and rinse thoroughly.

Boil in fresh water with bay leaves until tender but still firm.

3. The Sizzling Base

Brown the ground beef with diced onions and minced garlic.

Toast cumin, chili powder, and fresh spices directly in the pan.

4. The Slow Fusion

Stir in the cooked beans and crushed tomatoes.

Simmer on low to let the starch naturally thicken the sauce.

5. The Rest & Serve

Let the chili rest off the heat to fully settle the flavors.

Garnish with fresh cilantro, sour cream, and grated cheddar.

Cooking know-hows (3/3) - French Cassoulet Recipe



↓ **Malting** ↓



1. The Overnight Soak

Cover dried white beans (like Tarbais or Great Northern) with cold water.

Leave overnight on the counter to hydrate, plump up, and soften.



2. The Bean Simmer

Drain the soaked beans and simmer in fresh water with carrots, onions, and herbs.

Cook until tender but still holding their shape, reserving the cooking liquid.



3. The Meat Browning

Brown pork belly, Toulouse sausages, and duck confit in a deep pan.

Render the rich fats to create a deep, savory flavor base for the dish.



4. The Layered Assembly

Layer the cooked white beans and meats alternately in an earthenware dish.

Pour the reserved bean broth over the top until the ingredients are submerged.



5. The Slow Bake

Bake on low heat, breaking the top crust periodically to incorporate flavors.

Serve bubbling hot once a thick, golden-brown crust forms on top.

Malting
is the process name for
seed soaking and
germination

**Why not apply it on
pulses?**

Pulse/ oilseeds germination

Germination/ soaking scientific knowledge



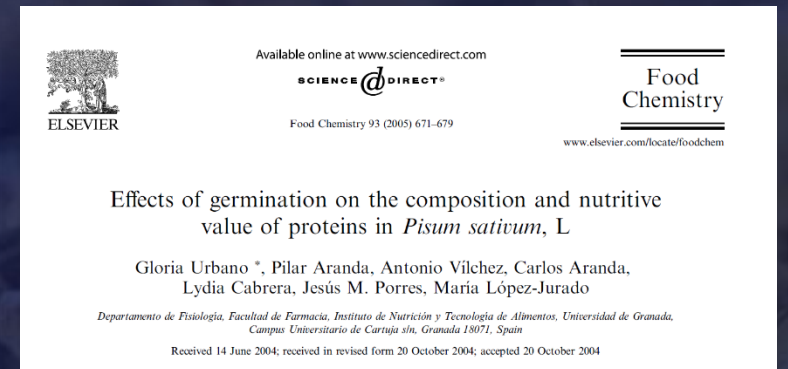
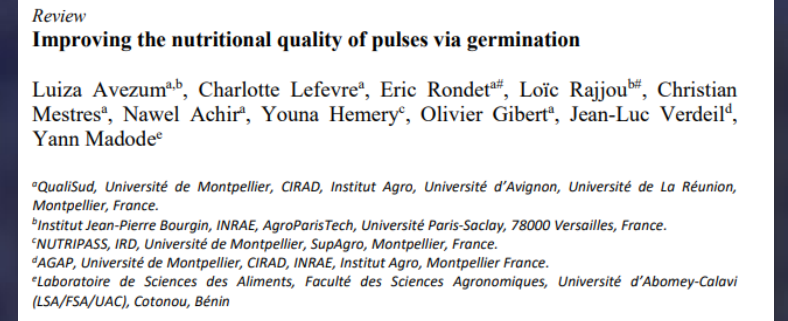
Significantly reducing certain **anti-nutritional factors:**
phytic acids, saponins,
trypsin inhibitors, α -galactosides



Increasing **antioxidants**,
polyunsaturated fatty acids or some
vitamins



Increasing **palatability** and
reducing “green taste”



Pea and Soy germination study

Step 1 Defining the optimal germination conditions

Step 2 Identification of optimal germination time

Step 3 Germination impact on downstream processes

Step 4 Germination benefits assessments on applications



Study performed in our R&D facilities

- Micro malting (few kilos)
- Pilot plant (Few tons)

Step 1 – Defining the optimal germination conditions

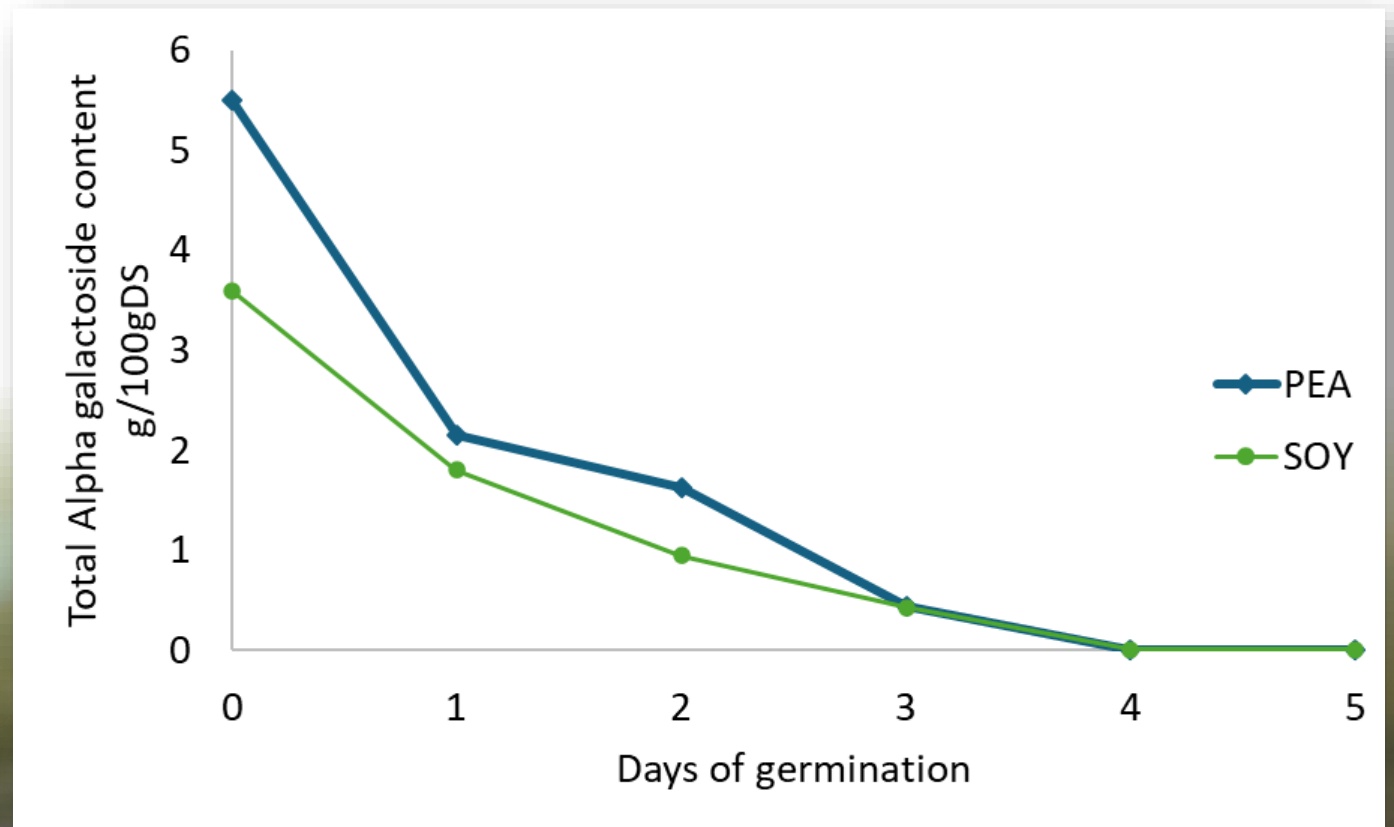
From grains to malt → what is the ideal germination duration for pulses ?

Alpha galactosidase content

A sugar family that no process can remove (except wet extraction)

Major problem for customer acceptance

→ Germinating for 3–4 days eliminates most flatulence-causing compounds



Step 2 – Compositional impact of soy pea and oat germination

Source	Day of germination	In vitro digestibility	Chemical index	IV PDCAAS
Pea	0	83%	0.71	0.59
	3	88%	0.96	0.84
Soy	0	90%	1.11	1.00
	3	92%	1.09	1.01
Oat	0	83%	0.76	0.62
	4	86%	0.83	0.71

Albumin

- Soluble protein partially washed during soaking

Rootlets (low IC)

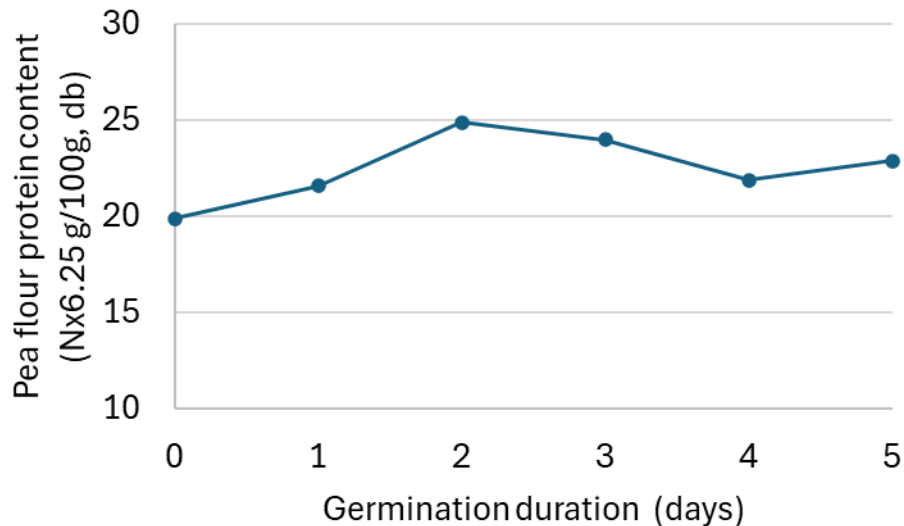
- Separated during degerming process

Take Home message:
Malting grains allow to improve protein digestibility through both PDCAAS and Amino acid profile rebalancing

Step 3 - Processability change

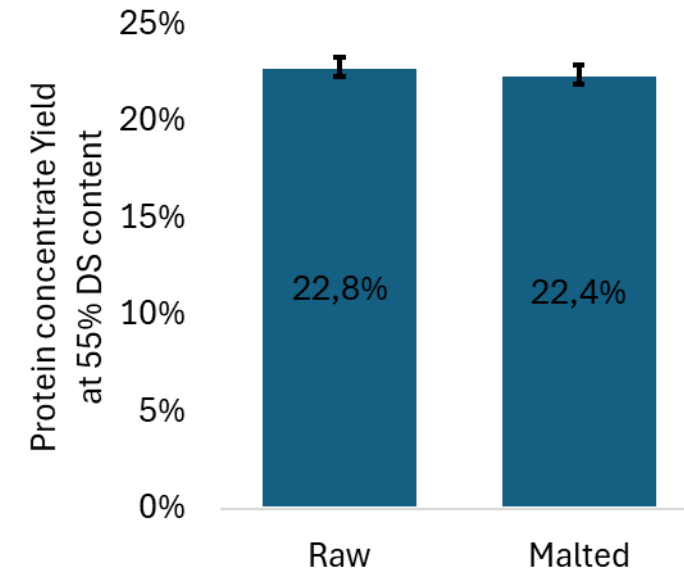
Dehulling process

Ability to rebalance flour composition



Protein concentrate production process

Identical protein concentrate yield



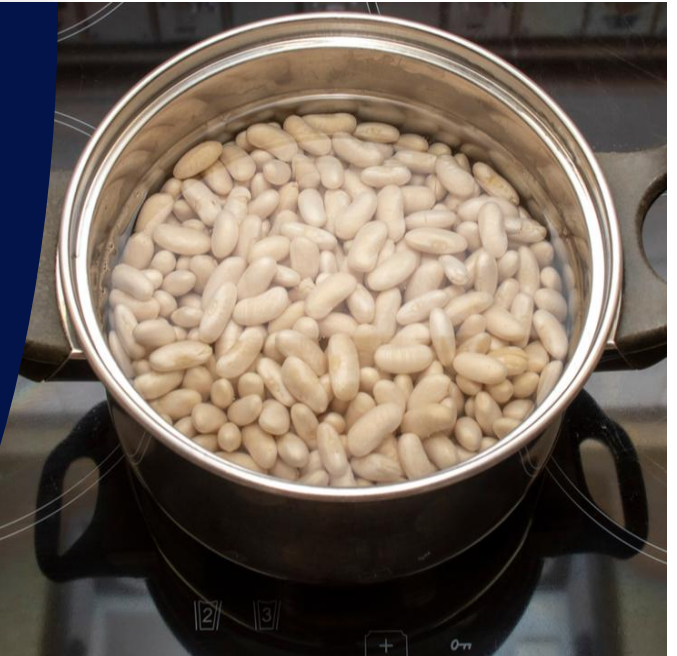
Take Home message:

You can switch your process from raw grains to malted grains without affecting your process but by improving the flour quality

Step 4 - Reduction of legumes cooking time

Raw pea	Short germination (3 days)	Long germination (5 days)
>30 min	≈ 15 min	≈ 5 min

**Pea germination
drastic reduction
in cooking time**



Take Home message:
Malting grains bring benefits to formulator but need to be validate application by applications. We have results to share on dairy analogues, extrusions, beverages, bread, etc... Let's explore faster together!

Conclusion of soy, pea and oat germination

Results & conclusion performed by IMPROVE SAS (protein specialists technical center)



Nutritional & Sensory Upgrades

Digestive Comfort & Quality

Complete elimination of alpha-galactosides (indigestible sugars causing flatulence) alongside highly enhanced overall protein digestibility.

Amino Acid Balance

Excellent rebalancing of essential amino acids, bringing the biological chemical index well above 1 compared to dietary benchmarks.

Organoleptic Improvements

Superior taste profiles and texture in bread and dairy-alternative beverage applications with a substantial reduction of "grassy" green notes.

Process & Technical Integrity

Milling & Yield Security

Zero negative yield impact: maintains fully standard commercial flour extraction and global protein recovery rates.

Protein Purity

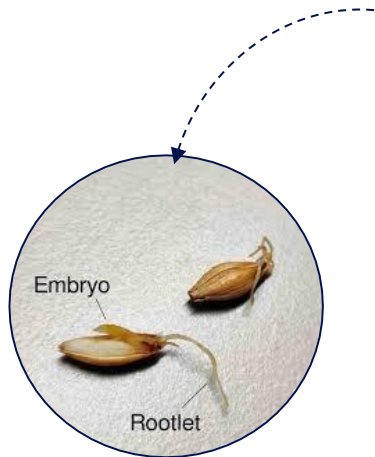
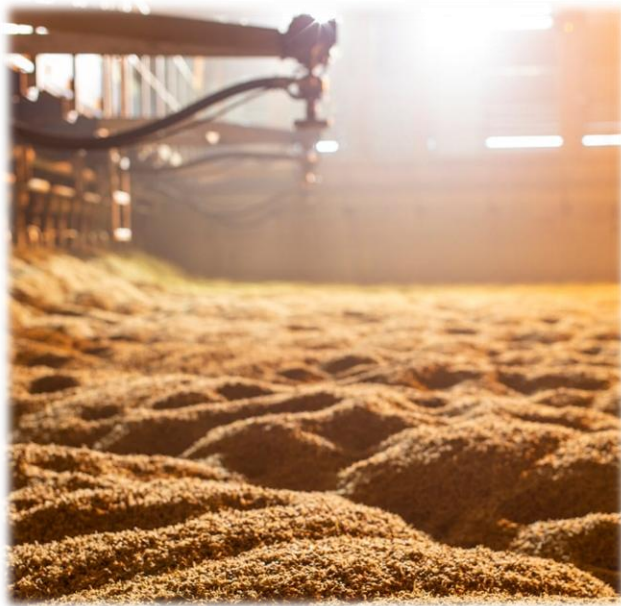
Purity parameters of plant protein fractions can remain completely intact compared to traditional un-sprouted grains.

Preserved Food Functionality

Proven zero negative effect on usage characteristics. Essential physical parameters like solubility, gelling, and emulsification remain active.

**Malting is also
an opportunity
to create
protein and
fibers solution**

Food grade powder of malt rootlets



Fibers 45%

Rich in soluble, prebiotic fibers.

Proteins 32%

Rich in essential proteins and amino acids.

Minerals

Rich in magnesium, potassium.
Source of calcium, iron and zinc

Vitamins

Includes B1, B2, B3, B6 vitamins.

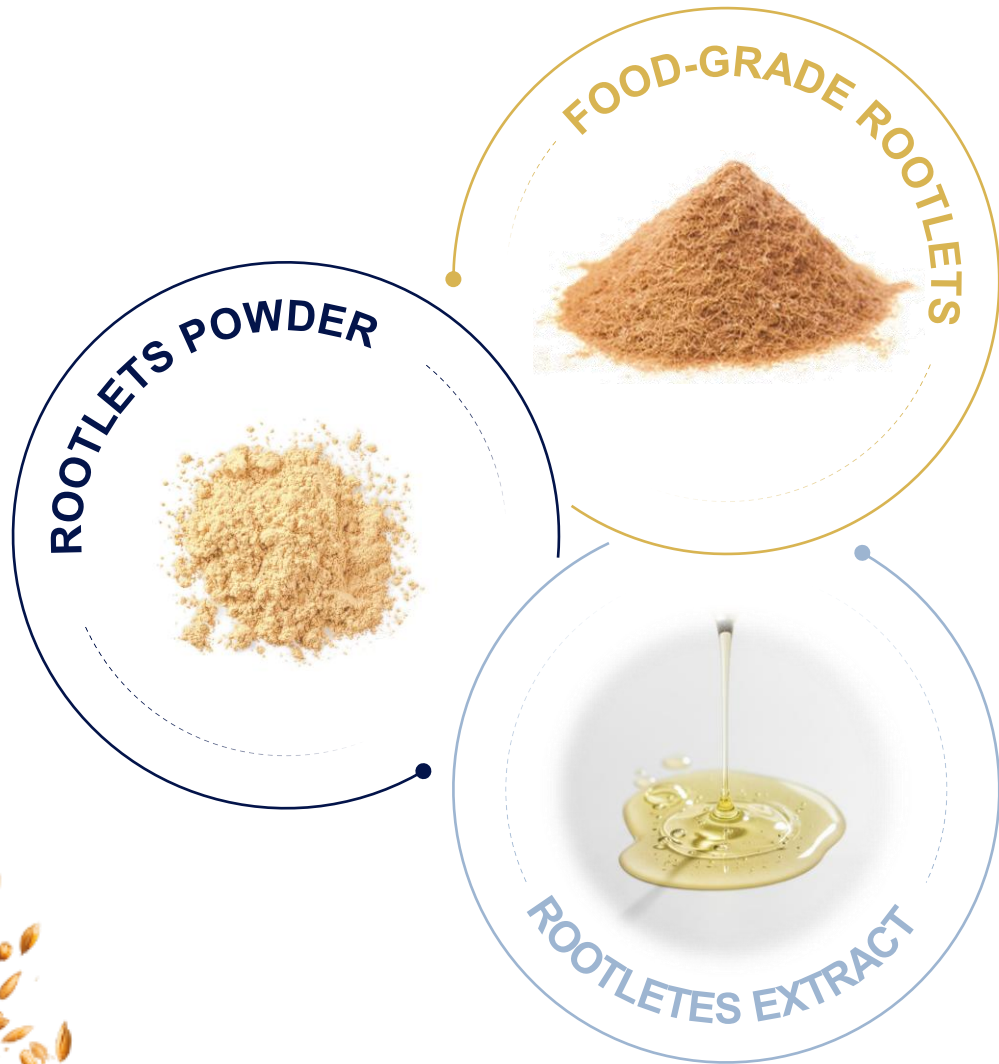
Antioxidants

High in polyphenols reducing inflammation.

Bioactive Compounds

Contain gamma-aminobutyric acid (GABA)

The rootlets ingredients landscape



Healthy composition

- Protein
- Fiber
- Minerals
- Micronutrients

Functionality

- Water and oil holding capacity
- Emulsification
- Foaming

Microbiota

- Prebiotic properties

Taste

- Umami
- Meaty if cooked

Including Powdered Malted Barley Rootlets increase the fiber content of the product

Ingredients	%	
	Chocolate cake	Chocolate cake source of fiber
Flour	16	11
Sugar	16	16
Egg	24	24
Yeast	1	1
Oil	10	10
Milk	22	22
Barley malt cocoa replacer	11	11
Barley rootlets	0	5


Chocolate cake
Source of fiber

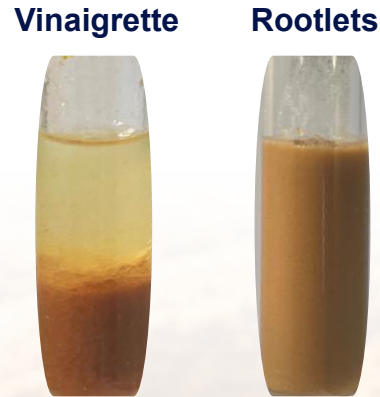



Including Powdered Malted Barley Rootlets improves emulsifying capacity

Sesame Soy Vinaigrette



+ 3% Powdered Malted Barley Rootlets



Barley rootlets powder is a **natural emulsifying agent** that could replace other traditional emulsifiers. It is ideal for creating vegetarian, and vegan emulsified sauces, providing a **smooth texture and enhanced stability**.

The higher fiber and protein content in the rootlets could strengthen the emulsion while also positively impacting its Nutri-Score.

Ingredients	%
Vegetal Oil	49
Water	19
Soy Sauce	12
Vinegar 7°	8
Sugar	4
Balsamic Vinegar	3
Powdered Malted Barley Rootlets	3
Mustard	2

Nutritional Values	Private Label Vinaigrette	+ 3% Powdered Malted Barley Rootlets
Energy (kcal)	481	479,4
Total Fat	50	49,1
Saturated Fat	4,1	4,0
Carbohydrates	6,9	8,3
Sugars	6,5	6,6
Dietary Fiber	0	1,3
Protein	0	1,8
Salt	1,9	1,9
Nutri-Score	E	D

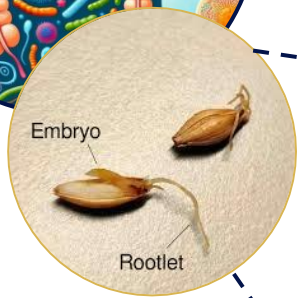
A prebiotic effect of the Malt Rootlets

Kinetic Colon-on-a-plate® technology (IN-VITRO)

Reduce risk of
Gastrointestinal Discomfort

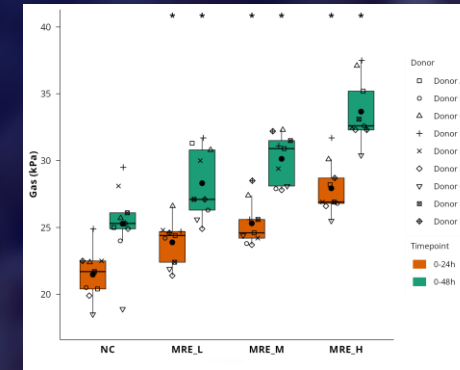
Microbial Fermentation Activity

Contribute to Inflammatory
Prevention



Microbiome responses on microbial fermentation activity of healthy adults.

The *gradual rise indicates a steady fermentation process*, reducing the risk of gastrointestinal discomfort.



Clear *correlation* with short chain *fatty acid profiles producers*.

- **Acetate Producers:** *Bifidobacterium spp.*, *Bacteroides spp.*, and *Lactobacillus spp.*
- **Propionate:** *Bacteroides spp.*, *Akkermansia muciniphila*, and *Veillonellaceae spp.*
- **Butyrate:** *Lachnospiraceae* and *Ruminococcaceae* families through complex cross-feeding.

The gradual increase of proteolytic fermentation remain moderate and varies by individual. It factor could contribute to maintaining intestinal integrity.

OUR VISION

UNLEASH THE POWER OF MALT

At Soufflet malt, we believe that germination is the key lever to create tomorrow ingredients

WE ARE ONLY AT THE BEGINNING

Towards future new ingredients?

CONVENTIONAL ADVANTAGES OF MALT INGREDIENTS

- Color improvement
- Nutrition improvement
- Taste improvement



Grain flour having new flavors: Fruits, vanilla, biscuit, meat, etc.



Cereal flour rich in bioactive molecules (*Vitamins, antioxydants*)



Cereal flour rich in digestible fibers & protein



Flour from germinated seeds (*pulse, oil seeds, etc.*)



Cereal flour rich in minerals (*Ca, Mg*)

**THANK
YOU**

BRIDGE2FOOD
EUROPE