TRADINNOVATIONS

INTERNATIONAL SUMMER SCHOOL
01/07/25 to 03/07/25
University of Ljubljana, Slovenia

PROGRAM & BOOK OF ABSTRACTS

Funded by
the European Union

BOOK OF ABSTRACTS
TRADINNOVATIONS INTERNATIONAL SUMMER SCHOOL 2025

PHOTOS BY: Personal archive of participants
TECHNICAL EDITOR: Anja Bolha, Mojca Korošec, Biotechnical faculty, University of Ljubljana, Slovenia

Published by: Univerza v Ljubljani, Biotehniška fakulteta, Oddelek za živilstvo
First electronic edition
Ljubljana, 2025
Electronic version available at https://repozitorij.uni-lj.si/IzpisGradiva.php?id=177720

Funded by the European Union

Kataložni zapis o publikaciji (CIP) pripravili v Narodni in univerzitetni knjižnici v Ljubljani
COBISS.SI-ID 261504515
ISBN 978-961-6908-38-2 (PDF)

Summer School 2025 Programme

Location:
Food Science and Technology Dept. (room Ž1), Biotechnical Faculty UL
Jamnikarjeva 101, 1000 Ljubljana, Slovenia

DAY 1	**Tuesday, 1st July**
8:30 – 9:00	Welcome Breakfast
9:00 – 9:45	**Icebreakers** (G. Garrier, R. Barbar; IAM)
9:45 – 11:00  Online (link)	**Presentation of the Tradinnov project** (G. Garrier, R. Barbar; IAM)
11:00 – 13:00  Online (link)	**Introduction and presentations of Tradinnov seminars by students** (6 presentations : 15 min presentation + 10 min Q&A)
13:00 – 14:00	**Catering Lunch**
14:00 – 15:00	Guided walk around the campus
15:00 – 19:00	**Parallel sessions**
Students **Staff**  Online (link)	**15:00 – 18:00 | Workshop 1 : INNOVATE UNDER CONSTRAINT** (C. Lavelle; MNHN) **18:00 – 19:00 |** Dinner Preparations by students **15:00 – 19:00 |Transnational meeting** for consortia members - 3:00pm-3:45pm: TM2 start (project management, activities in museums) - 3:45pm-5:30pm: WP4 collaborative work session - 5:30pm-6:00pm: Break - 6:00pm-7:00pm: What's next for Tradinnovations?
19:30 Onwards	**Cocktail Dinner on the faculty, prepared by Tradinnov students**

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

DAY 2	Wednesday, 2nd July
8:30 – 9:00	Breakfast at the faculty
9:00 – 10:00	**L1: Kitchen chemistry** (A. Hopia; TURKU)
10:00 – 11:00	**L2: Sensory analysis in food innovations** (M. Korošec, A. Bolha; BF-UL)
11:00 – 12:00	**L3: Testing Precisions to Determine Optimal Recipes** (R. Burke, TUDublin)
12:00 – 13:00	Discussions
13:00 – 14:00	**Catering Lunch (prepared by BF)**
14:00 – 17:00	**Field trip: Between tradition and innovation**
Evening	**Free evening**

DAY 3	Thursday, 3rd July
8:30 – 9:00	Breakfast at the faculty
9:00 – 12:00	**Workshop 2:** MYSTERY BOX (N. Rintala; TURKU)
12:00 – 13:00	**Catering Lunch (prepared by BF)**
13:00 – 14:00	**L4: Interaction between science and cooking** (P. Garcia, X. Monzo, UPV)
14:00 – 15:00	**L5: Inclusive Gastronomy - A Challenge that Requires Creativity, Innovation and Clear Communication** (P. Mata, B. Leite; NOVA)
15:00 – 16:00	**Mental model, feedback on the Summer School, and discussions for further work in 2025/26**
18:00 – 19:00	Ljubljana ethnographic city tour
19:30	**Final dinner**

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

PROJECT PRESENTATION

Trad'Innovations is a 3 years Erasmus+ academic cooperation partnership project coordinated since 2023 by Institut Agro Montpellier, bringing together six academic partners and nine associated partners. This rich European and Mediterranean consortium offers students a unique opportunity to engage in a project-based learning approach that combines food sciences with the humanities, fostering strong interaction between students, teachers, and socio-economic stakeholders.

Multidisciplinary and meaningful, this project carried out across the partner countries invites students from various fields (food engineering, agricultural engineering, culinary sciences, nutrition, etc.) to revisit traditional recipes by adapting them to vulnerable populations with specific needs. Trad'Innovations aims to build an innovative approach that takes as its starting point the scientific analysis of traditional recipes and culinary heritage. The project focuses on the manipulation of textures and the scientific study of the phenomena affecting quality, taking into account cutting methods, cooking processes, and formats to facilitate finger food and adapted consistencies.

The year 2025 marked the organization of the very first Trad'Innov summer school, held at the University of Ljubljana in Slovenia from July 1st to 3rd, 2025. Organized in partnership with the host university, this international event brought together nearly forty participants from Finland, Ireland, Spain, Portugal, Slovenia, and France. Students and educators came together for three days of rich and dynamic exchanges centered on culinary traditions and interculturality.

This first summer school left a strong impression thanks to its human and cultural richness. Culinary culture can be described as a true language: ingredients form a vocabulary that, when combined, create dish-sentences and meal-texts. And for this first edition, the ingredients of its success were chosen by the participants themselves: synergy and interculturality!

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

EDITORIAL BOARD

Mojca Korošec
Biotechnical Faculty, University of Ljubljana, Slovenia
mojca.korosec@bf.uni-lj.si

Mojca Korošec is an associate professor of nutrition at the Biotechnical Faculty, University of Ljubljana. Her research combining mentoring master's and PhD students focuses on food composition, quality parameters, and sensory properties of food related to authenticity and acceptance. As a lead or partner, she participates in national and EU projects on the sustainability of diets and food systems. She enjoys integrating traditional foods into new environments. She is chair of the Slovenian hub for food sensory research, an active member of the Sensory Analysis Working Group of the International Honey Commission, and a member of the Expert Group of the EU Honey Platform.

Anja Bolha
Biotechnical Faculty, UL, Slovenia
anja.bolha@bf.uni-lj.si

Anja Bolha is a researcher and a PhD student in nutrition at the Biotechnical Faculty, University of Ljubljana. She received her Bachelor's degree in Food Technology and Nutrition from the same faculty in 2015, followed by a Master's degree in Nutrition in 2018. Her primary research interests include sensory analysis, school nutrition, sustainable nutrition, food reformulation, traditional food products, and diet planning.

Reine Barbar
Institut Agro Montpellier, France
reine.barbar@supagro.fr

Reine Barbar is an associate professor in food science & physical chemistry of food systems at Institut Agro-Montpellier conducting research at the joint research unit of Agropolymer Engineering and Emerging Technologies at Montpellier-France. She is implicated in several innovative educational approaches to engage more interdisciplinarity among teaching modules. She conducts research on Mediterranean cereals and legumes from both processing and functional properties in end-products with a special attention on traditional recipes and innovation for sustainable purposes as well as societal needs. She initiated the Erasmus+ TRADINNOVATIONS project with actions implemented on both local and European & Mediterranean scales.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Gaëlle Garrier
Institut Agro Montpellier, France
gaelle.garrier@supagro.fr

Gaëlle Garrier is a food engineer and project manager for the Erasmus+ TRADINNOVATIONS project at Institut Agro Montpellier. She obtained her Bachelor's degree in Earth and Life Sciences from the University of New Caledonia in 2021, followed by an engineering degree in Food Science and Technology from Polytech Montpellier in 2024. She has been working on the Tradinnov project for a year, coordinating the project at both the European level (ERASMUS Agency) and the local level in France, and supporting students throughout their experimental work.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

SCIENTIFIC COMMITTEE

FOOD INNOVATION UNDER CONSTRAINT

Christophe Lavelle
CNRS / National Museum of Natural History / Sorbonne University, France
christophe.lavelle@mnhn.fr

Abstract
As true alchemists of edible matter, cooks and pastry chefs mobilize their knowledge and senses to produce the finest food and drink, and constantly invent new recipes that depend on a skillful interplay of flavors and textures. “Cooking, while not ceasing to be an art, will also become a science” announced Escoffier in 1907, in the preface to his famous culinary guide.
In this workshop, we decided to use our theoretical and practical skills to address some challenges particularly relevant in regards to current trends and demands on food supply. For this, starting with a shared “basket” of various products (mainly inspired by the Mediterranean diet: lots of vegetables, cereals, mushrooms, some dairy products, a little bit of white meat), the students were divided in 4 groups, each of them being asked to prepare a dish with the following constraint:

- No teeth (food adapted for senior)
- No fork (food adapted for patients with neurodegenerative disorder)
- No salt (food adapted for patient with high blood pressure)
- No animal (food adapted for vegan)

Key-words: Cuisine, Recipes, Innovation, Adaptation, Food science

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Christophe Lavelle is a research scientist at the CNRS, working at the National Museum of Natural History & Sorbonne University in Paris, France. He is an expert in biophysics, epigenetics and food science and teaches in many universities and professional schools. He is also responsible for the scientific training of cooking teachers and co-authored more than 50 research papers and 15 books on food. Often solicited by the media for his interdisciplinary expertise in food, he is a member of several scientific and food societies (including the French and the American Biophysical Societies and the Association for the Study of Food and Society).

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

CHEMISTRY IN THE KITCHEN: ON THE CHEMICAL AND PHYSICAL PRINCIPLES THAT SHAPE OUR PERCEPTIONS

Anu Hopia
Nutrition and Food Research Center, University of Turku, Finland;
anuhop@utu.fi

Abstract
Cooking is, at its core, a combination of chemistry and physics. Every time we mix, heat, emulsify, ferment, or whip ingredients, we initiate chemical and physical transformations that influence our senses, build expectations, evoke memories, and create multisensory eating experiences. Viewing cooking from a chemistry perspective helps us understand why ingredients behave as they do and how this knowledge can inspire creativity, improve dishes, and support food innovation.

Our sense of sight is the first to guide our perceptions. It tells us what we are being offered to eat: is it safe to consume, what is its quality, and do we like it? Indeed, sight is a powerful sense that influences our other perceptions and our liking of a dish. With our human eyes, we see the world through specific wavelengths of electromagnetic radiation. We perceive visible light as a combination of radiation between approximately 400 and 700 nanometers. It is good to remember, however, that other species on this planet may perceive the world very differently.

Food color results from molecules that absorb specific wavelengths of visible light and reflect the remaining wavelengths, which we perceive as color. For example, carotenoids absorb efficiently in the blue (~400–500 nm) region, thus reflecting and appearing as orange-red hues such as those of carrots and tomatoes. Anthocyanins present for example in strawberries, raspberries, blue berries and purple cabbage give rise to their deep red, purple, or blue colors. The structures of anthocyanin molecules are modified by pH, allowing chefs to adjust the hue of anthocyanins with acidity. Browning reactions like caramelization and aminocarbonyl (Maillard) reactions also create rich brown colors, raising expectations of roasted or toasted flavors and influencing perceptions of quality, origin, and safety.

Taste perception arises when specific molecules bind to receptors in our taste buds. Sweetness comes from dissolved sugars or other sweet-tasting molecules, while saltiness results from mineral salts like sodium or potassium. Sourness is perceived from organic acids, often released or enhanced through fermentation processes such as in dairy or vegetables. Bitterness comes from alkaloids and phenolic compounds, sometimes intensified by heat treatment. Umami, the savory taste, is created by specific amino acids and nucleotides produced when proteins break down through cooking or fermentation. Successfully layering these tastes is fundamental in creating balanced and enjoyable dishes.
In food and cooking, taste molecules also contribute in many other ways. For example, sugars have roles far beyond sweetness. Functionally, they increase viscosity in syrups, retain moisture in baked goods, control freezing in ice creams, and manage crystallization in candies. Chemically, they participate in key thermal reactions. During caramelization, at temperatures between 160 and 180°C, sugars degrade to form compounds like diacetyl, maltol, and furans, creating brown color, toasty aromas, but also slight bitterness and even acidity. In

Funded by the European Union

aminocarbonyl (Maillard) reactions, reducing sugars react with amino acids, and through several sequences of reactions form pyrazines, pyrroles, and melanoidins, creating complex flavors such as roasted, nutty, or meaty notes. These reactions yield different flavors and colors depending on the starting compounds and reaction conditions such as pH. This wide range of possibilities in creating new structures, flavors, and colors provides a rich playground for food product development and innovation.

Our sense of smell detects volatile organic compounds, or VOCs, which are responsible for the aroma profile of foods. These VOCs stimulate olfactory receptors, connecting scents with emotions and memories. Many food ingredients are rich in naturally present fragrant aromas. For example, linalool in basil, eugenol in clove, and thymol in thyme give herbs their distinctive aromas, while esters such as ethyl-methylbutanoate in pineapple or isoamyl acetate in banana provide characteristic fruity scents. Safeguarding these fragrant molecules from decomposition is one task for the chef, while creating new aromas through heat or harnessing enzymatic activity in raw materials is another.

Onion chemistry is a particularly engaging example of enzymatic reactions in food. While an intact onion has a very mild smell, slicing or crushing it develops a sharp, pungent aroma and brings tears to the chef's eyes. Cutting an onion breaks its cell structures and allows the enzyme alliinase to act on sulfur-containing amino acid sulfoxides stored in separate compartments within the cell. The alliinase reaction produces sulfenic acids, which are further converted by lachrymatory factor synthase (LFS) into propanethial S-oxide, a volatile compound that reacts with moisture in our eyes to form diluted sulfuric acid, causing tears. Additionally, sulfenic acids can polymerize to form thiosulfinates, thioaldehydes, and polysulfides, which contribute to the characteristic pungent and evolving aroma of onions. Techniques such as cutting, salting, drying, or rinsing onion slices can modulate these aromas, showcasing the practical applications of enzymatic chemistry in professional kitchens.

Chemosense, or trigeminal perception, involves sensing irritation from chemical compounds. This includes the dryness of tea polyphenols (astringency), the burning sensation of capsaicin in chilies, or the cooling effect of menthol. These sensations enrich food experiences by adding another layer of complexity to flavor beyond taste and smell.

When cooking, we should not forget the **sense of hearing**, which also plays an important but often underestimated role in food perception. The crunch of potato chips or crisp bread is created when starch turns glassy after water evaporation, while the fizzing sound of champagne arises from CO_2 release and bubble collapse, signaling freshness and luxury. These mechanical and physical phenomena, underpinned by chemistry, are essential for enjoyment. Texture is chemistry too. Smooth vs. gritty, airy vs. dense – what type of **tactile sensations** would you like to create? When we mix, whip, or beat – often combining our physical efforts with heat or chemical manipulation – we build complex dispersed systems with numerous combinations of liquids, solids, and gases. One example of creating interesting structures is protein denaturation. Heat causes proteins to unfold and coagulate, as seen in egg whites, which begin to set at around 61°C. Acids can also denature proteins by protonating amino acid side chains, particularly affecting carboxylate and amino groups, disrupting ionic bonds, and leading to unfolding, as in ceviche. When heat and acid act together, they have a synergistic effect, efficiently denaturing proteins as in poached eggs or mussels cooked in acidic liquids.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Manipulating protein structure alters mouthfeel, juiciness, and water retention – all crucial for gastronomic and culinary success.

Chemistry and creativity combine both in our traditional and modern innovative dishes. While innovating today with new tools and ingredients, it is good to remember that innovation and continuous development are crucial elements of food culture. One historical example is mock apple pie.

Mock apple pie recipe

Ingredients:

- 250 g shortcrust pastry, 5 dl (500 ml) water, 250 g sugar, 2,5 g malic acid, 2,5 g tartaric acid, 25 round salted crackers, 2 g of cinnamon

Instructions:

1. Grease a pie dish (approx. 25 cm in diameter) and press the shortcrust pastry into the bottom.
2. Bring to a boil the water, sugar, malic acid, and tartaric acid.
3. Add the crackers carefully into the boiling mixture and simmer gently for about 3 minutes for the crackers to swell and absorb the sweet& sour liquid. Do not stir, so the crackers maintain their shape and resemble apple slices in texture.
4. Using a slotted spoon, gently transfer the swollen crackers onto the pie crust (let excess liquid drain off first).
5. Sprinkle cinnamon on top of the sweet&sour cracker filling
6. Bake the pie at 175 °C for about 25 minutes, until golden.

Mock apple pie dates back to the mid-1800s. It is told that during winter, when apples were scarce and dried apple stores used up, inventive home cooks would use soaked soda crackers or stale bread to recreate the texture, and sugar and organic acids to create the sweet acidity of apples. The more modern Ritz cracker version appeared in the 1930s. Nabisco did not invent the recipe but popularized it by printing it on Ritz cracker boxes, which helped many during the Great Depression when apples were expensive.

In mock apple pie, tart and crisp tartaric and malic acids, sugars, and crackers recreate the flavor and texture of apples without using actual apples, with the scent of cinnamon completing the illusion.

In conclusion, food is more than molecules, but molecules truly matter. Understanding kitchen chemistry expands creativity and empowers us to design memorable, multisensory eating experiences that honor culture, tradition, innovation, and science. With understanding, we can innovate – not just replicate.

Key words: Kitchen chemistry, Food perception, Multisensory eating, Culinary creativity, Tradition and innovation

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Professor **Anu Hopia** (born 1960) is associated with the Nutrition and Food Research Center at the University of Turku/EPANET in Finland. Since 2008, she has held the position of Professor of Food Development at the University of Turku, overseeing a multidiciplinary team of 15 members. Her research focuses on diverse aspects of health and sustainability in food, and their interplay of food perception and experience.

With a background in food chemistry, Professor Hopia is currently engaged in scientific and societal work on the multisensory perception of food, exploring motivations behind food choices, preferences, and the formation of taste and flavor compounds in various food items. Her collaborative network extends across a range of academic disciplines, including food sciences, medicine, architecture, ethnomusicology, mathematics, as well as art and craftsmanship.

Beyond academia, Professor Hopia collaborates closely with the food sector, spanning agriculture, food industry, and the food service sector. Her approach underscores the importance of interdisciplinary collaboration in addressing complex challenges in the realm of food research.

Professor Hopia's extensive contributions are reflected in over 130 scientific papers and 8 popular books, showcasing her commitment to advancing knowledge in her field. She actively participates in the popularization of science, making valuable contributions to public understanding and awareness.

Funded by the European Union

SENSORY ANALYSIS IN FOOD INNOVATIONS

Mojca Korošec and Anja Bolha
Biotechnical Faculty, University of Ljubljana, Slovenia
mojca.korosec@bf.uni-lj.si; anja.bolha@bf.uni-lj.si

Abstract
Food innovation is a cornerstone of a competitive market, focusing on product differentiation and the development of value-added goods. However, the success of any novel food product is fundamentally determined by consumer perception and acceptability, which often differ significantly from the producer's intended outcome. This lecture examines the essential role of sensory analysis in bridging this gap, providing tools to understand and predict consumer responses to new food items. The acceptability of food innovation is a complex, multifactorial process influenced by biological-genetic, psychological, physiological, and socio-cultural factors. Sensory characteristics, such as aversion to taste, texture, or appearance, are identified as key reasons for food rejection, alongside consumer fear of negative consequences or lack of appropriate information. Therefore, effective innovation requires a rigorous approach to sensory evaluation. The presentation highlights the importance of methodological context, emphasising the need to balance controlled laboratory settings with natural environments when studying food choice and eating behaviour. Ultimately, a balanced, multidisciplinary approach that considers both simplification and contextualisation is crucial to ensuring that innovations successfully achieve market acceptance.

Key-words: Sensory analysis, Food innovation, Consumer perception, Food acceptability, Contextual factors

Mojca Korošec
Biotechnical Faculty, UL, Slovenia

Mojca Korošec is an associate professor of nutrition at the Biotechnical Faculty, University of Ljubljana. Her research combining mentoring master's and PhD students focuses on food composition, quality parameters, and sensory properties of food related to authenticity and acceptance. As a lead or partner, she participates in national and EU projects on the sustainability of diets and food systems. She enjoys integrating traditional foods into new environments. She is chair of the Slovenian hub for food sensory research, an active member of the Sensory Analysis Working Group of the International Honey Commission, and a member of the Expert Group of the EU Honey Platform.

Anja Bolha
Biotechnical Faculty, UL, Slovenia

Anja Bolha is a researcher and a PhD student in nutrition at the Biotechnical Faculty, University of Ljubljana. She received her Bachelor's degree in Food Technology and Nutrition from the same faculty in 2015, followed by a Master's degree in Nutrition in 2018. Her primary research interests include sensory analysis, school nutrition, sustainable nutrition, food reformulation, traditional food products, and diet planning.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

TESTING PRECISIONS TO DETERMINE OPTIMAL RECIPES

Róisín Burke
School of Culinary Arts and Food Technology, TU Dublin, City Campus, Grangegorman, Dublin, Ireland.
roisin.burke@tudublin.ie

The co-founder of Molecular Gastronomy, Hervé This, has identified three particular elements of recipes: A 'definition': the minimal technical part of the recipe which leads to the production of the food, often consisting of an operating protocol; for example, the definition of 'marmalade' involves slices of oranges plus sugar plus heat. 'Culinary precisions': these are all the technical additions that are not part of the 'definition'; in the marmalade recipe, it is sometimes 'said' that you have to cook until a drop of the liquid forms a gel on a cold plate. A third part, including information that is not a matter of technique, but has perhaps an artistic or social dimension; again, in the case of the marmalade recipe, the fineness of the shredding of the slices is a measure of success. Some people prefer 'coarse cut' marmalade, while others prefer 'fine cut' marmalade. The precision that 'whipped egg whites foam faster when some salt, or lemon juice is added' was tested. Also, the effect of adding cream of tartar and sugar was tested. Egg white from two eggs was added to each of four bowls and 0.5 g of salt (NaCl) was added to one bowl, 2 mls of lemon juice to another, 0.5 g of cream of tartar to another and there was no addition to the final bowl until the egg whites had been whipped (5 g of sugar) and then they were whipped again for 3 minutes. All samples were whipped in the same type of glass bowl, with the same type of hand whisks for equal amounts of time. Adding lemon juice, or cream of tartar or sugar (towards the end of the whipping stage) improved the stability of the egg white foam whereas salt destabilized the foam causing liquid to drain from very soon after whipping had ended. More precise tests would need to be carried out on the amounts of ingredients added and the time of whipping for each sample.

Recipes

Egg white from two eggs was added to each of four bowls and 0.5 g of salt (NaCl) was added to one bowl, 2 mls of lemon juice to another, 0.5 g of cream of tartar to another and there was no addition of to the final bowl until the egg whites had been whipped (5 g of sugar). All samples were whipped in the same type of glass bowl, with the same type of hand whisks for equal amounts of time and sugar was folded into the whipped egg white which had no addition until then. It was whipped again for a further 3 minutes.

Figure 1: Before and after whipping the samples.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

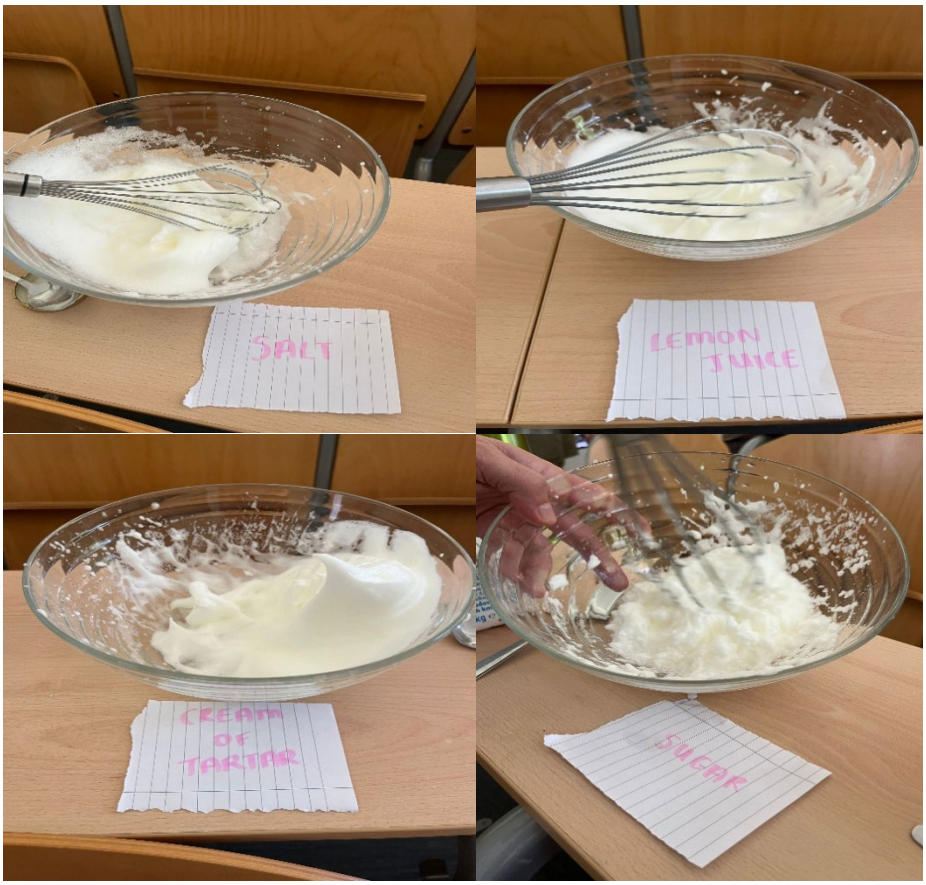


Figure 2: Whipped egg whites, plus salt (top left), plus lemon juice (top right), plus cream of tartar (bottom left) and plus sugar (bottom right).

The salt increased the whipping time and decreased the foams stability. The Na^+ and Cl^- competed for binding sites on the unfolded protein molecules reducing the number of protein-protein bonds and weakening the overall structure (McGee, 2004). The structure started collapsing and liquid began to drain out after a short time of standing.

Both Lemon Juice and Cream of Tartar are acidic. The maximum stability of egg white foam is found to be at a pH near or at the isoelectric pH, due to the increasing rate of protein adsorption as a consequence of decreased repulsive forces at the air-water interface and lower protein solubility. Egg white is known to produce the best foams at about pH 4-5, which is near to the isoelectric point of many egg white proteins.

Sugar increases viscosity which slows drainage and improves stability. However, if added early, during whipping, it delays foaming and reduces the foams volume and lightness. The sugar will interfere with the unfolding and binding of proteins. Recipes will usually add sugar towards the end of the whipping process when it is folded in and whipped again until the peaks stand firm and are glossy.

Key words: Precisions, Egg whites, Recipes, Acid, Salt, Sugar

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Róisín Burke is a Senior Lecturer in Culinary Science and Food Product Development in The School of Culinary Arts and Food Technology, TU Dublin, Ireland.

Her B.Sc. (Hons) and Ph.D. were awarded from University College Dublin. Her research focuses on Molecular Gastronomy, alternative protein sources to meat, 3D food printing and 4D food printing. She is the TU Dublin co-ordinator for the EU M.Sc. in Food Innovation and Product Design FIPDes.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

MYSTERY BOX WORKSHOP IN RECIPE INNOVATION

Nanna Rintala
Nutrition and Food Research Center, University of Turku, Seinäjoki, Finland
nanna.rintala@utu.fi

Abstract
The Mystery Box Workshop was a three-hour cooking event designed for a diverse group of international university students at the Tradinnovation Summer School in Slovenia. Its primary goals were to foster creativity and innovation in cooking, encourage recipe development, and promote team building and enhance cross-cultural interaction.

Two traditional recipes were selected as the foundation for the workshop: **Stuffed Peppers** from Slovenia and **Salmon Soup** from Finland. Students were divided into four mixed teams, each consisting of four members. Each team received a mystery box containing ingredients for one of the two dishes—without being told the original recipe. To avoid recognition of the original recipe, Finnish and Slovenian students were intentionally placed in the multicultural teams working with the recipe from the other country.

Participants collaborated to create new interpretations using the provided ingredients, drawing on culinary traditions from their home countries. At the end of the workshop, each team presented their cooking process and final dish. The session concluded with a tasting and group discussion comparing the outcomes and sharing reflections.

Keywords: Recipe Innovation, Team building, Creative cooking, Traditional recipes

Nanna Rintala (1967) is a Project Specialist at the Nutrition and Food Research Center, University of Turku. Since 2015, she has contributed to numerous national and international projects that connect food with sustainability, multisensory evaluation, cultural heritage, and SME's. Her background as a food blogger, TV chef, and food journalist adds a unique perspective to her work, helping her translate scientific insights into engaging content for the public.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

INTERACTION BETWEEN SCIENCE AND COOKING

Javier Martínez Monzó, Purificación García Segovia
i-Food Team, FoodUPV , Universitat Politècnica de València, Spain.
xmartine@tal.upv.es and pugarse@tal.upv.es

Abstract
The integration of science and cooking has grown into an international movement that redefines gastronomy as both a field of cultural expression and technological innovation. This seminar examines how scientific principles and engineering tools are applied in culinary contexts to enhance creativity, preserve nutritional and sensory quality, and develop novel processes and products. Historical references, from Brillat-Savarin to Kurti and This, mark the evolution of this dialogue, which today involves universities, research networks, and chefs worldwide. In Spain, projects such as GASTROVAC illustrate how low-pressure cooking can conserve organoleptic properties while enabling new textures and flavors. Other examples—vacuum impregnation, osmotic dehydration, microencapsulation, and cold drying—show the potential of research to generate practical culinary applications. These methods not only accelerate knowledge in traditional processes but also open pathways for healthier and more sustainable gastronomy. Within this context, the i-Food team at the Universitat Politècnica de València has acted as a generator of interactions, developing prototypes, collaborating with leading chefs, and contributing to the dissemination of knowledge at national and international levels. This synergy science–cooking demonstrates how interdisciplinary research and creativity converge to enrich culinary practice and position gastronomy as a driver of innovation and socio-economic development.

Key-words: Gastronomy, Science, Synergy, Creativity, Gastrovac

Dr. Javier Martínez-Monzó and Dr. Purificación García-Segovia are full professors at the Universitat Politècnica de València and members of the i-Food research group. Their work integrates food science, engineering, and gastronomy, with a focus on culinary innovation, sensory evaluation, and product development. They have authored over 100 articles indexed in Web of Science and have coordinated more than 40 research projects and supervised around 15 doctoral theses. Additionally, they collaborated with chefs, researchers, and companies to explore new techniques and transfer knowledge. Their activity has contributed to the recognition of i-Food within the academic and professional community.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

INCLUSIVE GASTRONOMY – A CHALLENGE THAT REQUIRES CREATIVITY, INNOVATION AND CLEAR COMMUNICATION

Bruno Moreira-Leite, Paulina Mata
NOVA School of Science and Technology, NOVA University of Lisboa, Portugal
b.leite@fct.uni.pt; mpm@fct.unl.pt

Abstract

This work, which uses as a case study the adaptation of the dessert Alphabet Soup by El Bulli (Adrià, Soler & Adrià, 2006) for consumption by people with various allergies (Sato, Moreira Leite & Mata, 2020), addresses inclusive gastronomy as a multidimensional challenge that intersects molecular gastronomy, nutrition, and food communication.

Alphabet Soup
Source: Adrià, Soler & Adrià (2006)

The growing prevalence of food allergies and intolerances (Panesar et al., 2013) represents a major challenge for modern gastronomy and increased the demand for high-quality meals that are free from common allergens. Replacing major allergens – such as eggs, dairy, and gluten-containing products – requires the use of alternative and less common ingredients to achieve the desired organoleptic properties. Hydrocolloids, derived from plants, algae, or microbial fermentation – such as gellan gum, xanthan gum, alginate and pectin – act as stabilizers, thickeners, or gelling agents in food preparations (Imeson, 2010) and have great potential to be used to replicate texture, structure and mouthfeel in allergen-free dishes.

Several formulations were tested in the recipe development, including a dairy-free ice cream based on horchata and emulsified with a custom stabilizer blend, as well as vegan meringues using aquafaba and an alginate-based gelling agent. Sensory analysis with a small focus group indicated that the allergen-free version was well accepted – often outperforming the original counterparts in terms of texture and overall impression.

Moreover, this work underscores the importance of recipe writing as an essential tool in inclusive food design. Poorly structured or incomplete recipes hinder accessibility and reproducibility. Best practices in technical recipe writing (Baker & Ostmann, 2001) to achieve clarity, precision and consistency were identified.

Inclusive gastronomy, supported by scientific knowledge and transparent communication, is an area requiring not only technical reformulation but also interdisciplinary training, and pedagogical innovation.

Keywords: Inclusive gastronomy, Allergen replacement, Food innovation, Hydrocolloids, Recipe writing

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Paulina Mata

Graduated in Chemical Engineering and PhD in Organic Chemistry.

Professor and Researcher at the Chemistry Department of NOVA School of Science and Technology (Retired since March 2022).

Coordinated (2010 – 2022), the MSc in Gastronomic Sciences (degree by NOVA FCT and ISA-ULisboa);

Scientific interests are in the areas of Organic Chemistry and Food Chemistry, particularly Stereochemistry, Education in Chemistry and Molecular Gastronomy;

Head of the Molecular Gastronomy research lab (2010 – 2022), focused on research and technological applications of Molecular Gastronomy.

Buno Moreira-Leite

Graduated in Economic Sciences (PUC-Rio, Brazil), MBA in Business Management (IBMEC-RJ, Brazil) and Culinary Arts (UNESA/RJ, Brazil) with a specialization in French Cuisine at Alain Ducasse Formation (ADF).

MSc in Gastronomic Sciences and PhD in Food Sciences and Technology (NOVA FCT, Portugal).

Researcher at the Associated Laboratory for Green Chemistry (LAQV@REQUIMTE) at NOVA School of Science and Technology (Since 2018).

Collaborator of the MSc in Gastronomic Sciences (Since 2018). Invited Assistant Professor at the Chemistry Department of NOVA School of Science and Technology (Since March 2022).

Scientific interests focus on novel food sources, the development of new food products, the application of hydrocolloids in foods, and molecular gastronomy.

Researcher (2018–2022) and head (since 2022) of the Molecular Gastronomy research lab, focused on research and technological applications of Molecular Gastronomy.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

STUDENT ABSTRACTS

WALNUT POTICA FOR SENIORS WITH DIABETES

ČOK Nives, KMECL Martin, LAZAR Mojca, ŠALAMIJA Nuša, ŽERJAL Hana
Biotechnical Faculty, University of Ljubljana, Slovenia
acjom.lazar@gmail.com, nusa.salamija4@gmail.com and Hana.zerjal@gmail.com
**Corresponding authors mojca.korosec@bf.uni-lj.si and anja.bolha@bf.uni-lj.si*

Abstract
Walnut potica (Orehova potica) is one of the most recognizable traditional Slovenian desserts. However, due to its sugar content and low levels of dietary fiber and protein, it does not meet the specific dietary needs of the elderly with diabetes. This group is often deprived of traditional holiday meals, especially desserts, which can negatively affect their well-being. With the desire to enable the elderly with diabetes to experience the holidays as traditionally as possible, we decided to develop a recipe for walnut potica that is adapted to their dietary restrictions and considers the needs of their bodies at this stage of life. The purpose of our research was to develop a recipe for an adapted walnut potica that preserves its characteristic appearance and taste while incorporating nutritional modifications for the target group of elderly individuals residing in social care institutions. By using sweeteners, whey protein, and dietary fiber, we created a recipe with reduced sugar content and an increased amount of protein and fiber. The adapted potica qualifies for nutritional claims such as "source of dietary fiber," "increased fiber content," and "reduced sugar," which were confirmed by nutritional profile analyses. The key challenge was optimizing the recipe to maintain the texture and taste of the traditional version. The research includes a sensory evaluation of the product, a technical specification for its preparation, and an acceptability analysis among the target group. The results show that the adapted potica significantly contributes to improving the diet of elderly individuals with restrictions, as it reduces the risk of hyperglycemia, helps prevent sarcopenia, and improves digestion. The adapted version of walnut potica represents a successful implementation of nutritional science in the preservation of cultural heritage and health.

Keywords: Diabetes, Elderly, Walnuts

Nuša Šalamija

Nuša Šalamija is a Master's student in Nutritional Sciences at the University of Ljubljana, currently completing a semester at the Technical University of Munich, with a particular interest in clinical nutrition and food security. She has experience in nutritional assessment, patient counseling, and specialized meal planning, applying scientific principles to practical settings. She has contributed to interdisciplinary projects bridging nutrition, food science, and environmental management, strenghtening her skills in applied nutrition research.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Mojca Lazar

Just a countryside girl trying to learn as much as possible about the world of food. Growing up on a farm has taught me how to grow your own crops, now in my studies I'm learning more about their processing and descovering endelss possibilities of inovative products.

Hana Žerjal

My name is Hana Žerjal and I am 23 years old. I dedicate a large part of my life to sports, which inspired me to study nutrition. I graduated in the field of food and nutrition. Currently I am attending the second year of master's degree in food science at the Biotechnical faculty in Ljubljana.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

RECIPE: SLOVENIAN POTICA

This traditional Slovenian dessert consists of a rich, yeast-leavened dough rolled thin and filled with a creamy walnut mixture, then baked until golden brown. It's perfect for celebrations or as a comforting treat with coffee.

DOUGH

List of ingredients

- 1 dcl mlik
- 1 tbs sugar
- 10 g fresh yeast
- 100 g butter
- 2 egg yolks
- 250 g flour

Method of preparation

1. In a cup, warm the milk (around 35–40°C), add the sugar and fresh yeast, and stir gently. Let it sit for 5–10 minutes until the yeast activates and becomes foamy.
2. In a small saucepan, melt the butter over low heat. Remove from the heat and let it cool slightly.
3. Separate the egg yolks from the whites (set the whites aside for the filling).
4. Place the flour in a large mixing bowl and make a well in the centre.
5. Pour the melted butter, egg yolks, and activated yeast mixture into the well.
6. Knead the dough by hand or with a stand mixer for about 15–20 minutes, or until the dough is smooth, elastic, and soft.
7. Cover the bowl with a clean kitchen towel and let the dough rise in a warm place until it doubles in volume (this usually takes 1–2 hours, depending on the room temperature).

WALNUT FILLING

List of ingredients

- 200 g crushed walnuts
- 2 dcl cream
- 2 tsp rum
- 50 g erythritol
- 25 g inulin
- 60 g whey protein
- 2 egg whites

Method of preparation

1. Place the crushed walnuts in a heatproof bowl.
2. In a small saucepan, bring the cream almost to a boil over medium heat.
3. Pour the hot cream over the crushed walnuts and stir well until combined.
4. Add the rum, erythritol, inulin, and whey protein to the walnut mixture and stir until all ingredients are thoroughly incorporated.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

5. In a separate clean bowl, whisk the reserved egg whites with an electric mixer until they form firm peaks.
6. Gently fold the whisked egg whites into the walnut mixture using a spatula, being careful not to deflate the whites, until just combined.

FORMING THE POTICA AND BAKING

List of ingredients

- 10 g butter (for greasing the mould)
- 1 egg (for egg wash)

Method of preparation

1. Grease a "potičnik" mould (a traditional Bundt-like pan with a central tube) or a 24-26 cm round cake pan with a hole in the middle, using the 10 g of butter.
2. On a lightly floured surface, roll out the risen dough into a large rectangle, approximately 0.5 cm thick.
3. Evenly spread the walnut filling over the entire surface of the rolled-out dough, leaving about 3 cm uncovered at the top long edge.
4. Starting from the bottom long edge, tightly roll the dough towards the top edge. Ensure each wrap is as tight as possible to prevent air pockets.
5. Carefully transfer the rolled potica into the greased mould, gently connecting the ends to form a circle.
6. Using a toothpick or wooden skewer, pierce the potica from top to bottom along its entire length at several points. This allows steam to escape during baking and prevents cracking.
7. Cover the mould with a clean kitchen towel and let the potica rise again in a warm place until it doubles in volume (approximately 30-60 minutes).
8. Preheat the oven to 200°C.
9. Beat the remaining egg in a small bowl to create an egg wash.
10. Brush the risen potica generously with the egg wash.
11. Once again, pierce the potica in the same holes as before, as the egg wash may have closed them.
12. Bake the potica in the preheated oven at 200°C for the first 10 minutes.
13. After 10 minutes, lower the oven temperature to 180°C and continue baking for another 30-40 minutes, or until the potica is golden brown and a wooden skewer inserted into the center comes out clean.
14. Once baked, remove the potica from the oven and let it cool in the mould for 10 minutes.
15. Carefully invert the mould onto a clean kitchen towel or wire rack, removing the potica. Wrap the warm potica in a clean kitchen towel.
16. Allow it to cool completely before slicing and serving.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

LÖRTSY - IS THERE A FUTURE FOR THIS TRADITIONAL FINNISH FOOD?

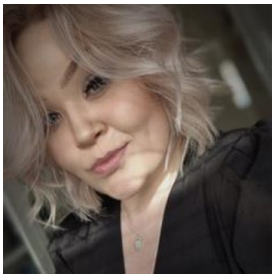
METSÄLÄ Piitu, SIMONEN Ella, TALVITIE Julia
University of Turku, Finland
piitu.metsala@gmail.com; emsimo@utu.fi; julia.talvitie@utu.fi
**Corresponding authors anuhop@utu.fi and nanna.rintala@utu.fi*

Abstract
Lörtsy is a thin, half-moon shaped pastry originally from Savonlinna, Eastern Finland. This student work examines the impact of selected ingredients of the original product on biodiversity and public health and evaluates the significance of modulating the original recipe from the perspectives of biodiversity and health. The chosen manufacturing method was baking in the oven. Traditional wheat dough was partially replaced with whole-grain flour, and a plant-based filling was chosen to replace the original filling consisting of ground beef and rice. As a result, the fiber content of the dough increased while the fat content decreased by changing the cooking method and the ingredients of the filling. Replacing meat reduces the ecological footprint by 40%, and rice by 20%, compared to the original. When innovating upon a traditional food, it is essential to balance nutritional improvements with still preserving the product's defining traditional characteristics.

Keywords: Biodiversity, Lörtsy, Traditional food, Health

Piitu Metsälä
Bachelor of Science, Biomedicine - Currently doing a Master's degree in Translational medicine. Interested especially in nutrition, health and gut microbiota. Also background in working as a waitress and a cook/baker.

Ella Simonen
Master of Science, biology - Currently pursuing a Master of Science (Technology) degree in Biotechnology with a specialization in Food Development. Holds a Master of Science degree in Biology with a minor in Plant Biology and a Bachelor of Science degree in Biology with a minor in Biochemistry.



Julia Talvitie
Bachelor of Engineering, Food Processing and Biotechnology - Advanced studies and internship in the dairy industry. The thesis examined the processing of black oat milk and the nutritional content of black oats. Plans to pursue further studies in the Master's program in food sciences.

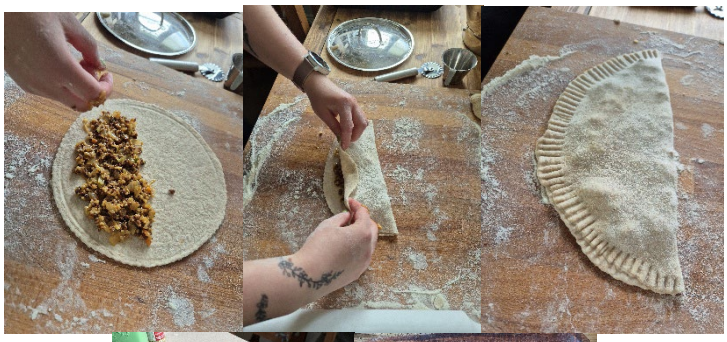
Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

RECIPE

Ingredients (dough)

- 2.5 dl water
- 12.5 g yeast
- 1 teaspoon of salt
- 1 teaspoon of sugar
- 25 g rapeseed oil
- 3 dl wheat flour
- 1.65 dl whole grain wheat flour



Fillings

- 1 onion
- 1 garlic
- 2 ¼ dl oat grain
- 1 dl textured soy protein
- 1 tablespoon nutritional yeast
- Spices; soy sauce, pepper, paprika, chili
- Vegetables; carrot, cabbage

The base recipe was adapted from a meat pie formulation suitable for experimental kitchen use.

Method

1. Dissolve the yeast in lukewarm milk.
2. Add salt, sugar, and melted butter or oil.
3. Gradually mix in the flour, one deciliter at a time.
4. Cover the dough with a cloth and let it rise in a warm place for about 45 minutes. Prepare the filling while the dough is rising.
5. Measure water into a saucepan and bring to a boil.
6. Add salt and oat grains. Cook for about 15 minutes, until the water has evaporated.
7. Brown the textured soy protein in a small amount of rapeseed oil, in another pan. Add spices and nutritional yeast, and water gradually as the liquid gets absorbed. Combine with the oat and shredded vegetables.
8. Divide the dough into four portions.
9. Roll each portion into a thin sheet (about 4 mm thick), using plenty of flour to prevent sticking.
10. Cut out circles from the dough using a sharp-edged bowl turned upside down.
11. Scoop about two deciliters of filling onto one half of the dough circle.
12. Fold the other half over and press the edges closed with your fingers or a fork.
13. Bake at 225°C for about 12-15 minutes. After the oven you can steam the lörtsys for 10–15 minutes to achieve the characteristic soft texture.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

MADELIS: A REINVENTED MADELEINE MOUSSE FOR DYSPHAGIA MANAGEMENT

NOQUET Perrine
Institut Agro Dijon, France
perrine.noquet@agrosupdijon.fr
**Corresponding authors reine.barbar@supagro.fr and gaelle.garrier@supagro.fr*

Abstract
Dysphagia, characterized by difficulties in swallowing, is particularly prevalent among elderly individuals and hospitalized patients. Current texture-modified foods are often perceived as unappealing and limited in variety. The objective of the project, developed within the Trad'Innov Summer School, was to transform the traditional French madeleine into *Madelis*, an innovative mousse designed to ensure both safety and pleasure in consumption. Following the IDDSI (International Dysphagia Diet Standardisation Initiative) framework, it optimized texture and cohesiveness to provide a homogeneous, soft structure with high water content and activity (aw > 0.9), suitable for safe swallowing. Experimental cooking sessions explored different mousse formats: raw, cooked, and gelled, followed by laboratory analyses of water content, density, and plastic rigidity. The final product preserves the sweet, buttery, and nostalgic taste of the madeleine while offering a nutritional profile of ~435 kcal/100 g. *Madelis* targets elderly individuals and patients with swallowing disorders, while also appealing to healthcare professionals seeking safe, ready-to-use products. Future work will focus on controlled gelification, ensuring microbiological safety, and establishing partnerships with medical institutions for real-world implementation.

Key-words: Dysphagia, IDDSI, Madeleine mousse, Texture modification, Food innovation

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

RECIPE: Madeleine mousse

Ingredients (prototype formulation):

- Madeleines (base material, crushed)
- Egg yolk and egg white
- Sugar
- Carrageenan (or gelatin in some trials)
- Milk (for texture adjustment)
- Salt (trace amount)

Method (experimental trials):

- Preparation: Crush madeleine bases.
- Mixing: Combine egg yolk, sugar, milk; homogenize.
- Texture setting: Incorporate carrageenan (or gelatin, depending on variant).
- Whipping: Add egg white for aeration (mousse effect).
- Cooking/conditioning: Depending on format – raw mousse, cooked mousse, or gelled mousse.
- Packaging: Individual pots (25 g per unit), stored at <4 °C.
- Shelf life: <30 days unopened; 3 days after opening.

Sensory characteristics:

- Texture: soft, homogeneous, mousse-like
- Taste: sweet, buttery, nostalgic
- Color: golden brown

Nutritional profile (per 100 g):

- 435 kcal
- Proteins: 20 g
- Carbohydrates: 41 g (of which sugars: 18.3 g)
- Lipids: 21.2 g (of which saturated: 2.5 g)
- Sodium: 0.9 g

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

FEEDING THE MEMORIES: TRADITIONAL FOOD REVISITED FOR ALZHEIMER'S PATIENTS

AMISSE Zainabo, BELHOUM Yahia, GENIN Noa, RODRIGUES Eduarda
Institut Agro Montpellier, France
genin.noa@gmail.com and yahia.belhoum@gmail.com
**Corresponding authors reine.barbar@supagro.fr and gaelle.garrier@supagro.fr*

Abstract
Elderly patients with Alzheimer's disease frequently suffer from malnutrition and social isolation, especially in hospital environments where mealtimes often lose their cultural and emotional meaning. *Feeding the Memories* is a project carried out within the Erasmus+ and TradInnovation framework to address this challenge by combining nutrition, tradition, and social inclusion. Inspired by patients' own choices, two iconic mediterranean recipes - a paella and a Tropézienne tart - were reimagined into safe, nutritious, and memory-evoking dishes. Following the IDDSI (International Dysphagia Diet Standardisation Initiative) standards, textures were adapted to ensure both safety and pleasure in consumption. Research and development combine culinary precision, sensory analysis, nutritional assessment, and eco-design to create products suitable for hospital implementation. The final prototypes included rice in tempura batter with three sauces and a mini-brioche filled with stabilized Tropézienne cream, achieving IDDSI level 4–5 consistency and aligning with elderly nutritional needs. Patient workshops and interprofessional collaboration with culinary students further enhanced inclusion, conviviality, and engagement. This project demonstrates that traditional gastronomy, when revisited through science and inclusion, can strengthen well-being, stimulate memory, and foster social bonds. Future work will focus on scaling this type of food production in healthcare facilities.

Key-words: Dysphagia, IDDSI, Alzheimer's disease, Traditional Recipes, Social Inclusion, Food Innovation

We are a team of final-year students at Institut Agro Montpellier (France), passionate about exploring how food can serve both health and social purposes. Through *Feeding the Memories*, we discovered how culinary science, tradition, and human care can come together to improve patients' lives. From lab experiments to sensory panels and real-life workshops in hospitals, this project has been a journey of creativity, teamwork, and impact. At this congress, we are proud to share how rethinking food can nourish not only the body but also the soul. For us, learning by doing it together and having a real impact has been the most rewarding part of the process.

Foreground: Left to right: Noa Genin and Hervé Boddington (chief)
Middleground: Left to right: Yahia belhoum and Reine Barbar
Background: left to right: Gaëlle Garrier, Eduarda Rodrigues and Zainabo Amisse

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Recipe 1 – Paella to Dip
Serves: 3 (20 rice-shrimp illusion)
Prep Time: 4h
Cook Time: 1h

Ingredients:

Almond milk reduction:

- 300g red pepper chopped
- 300g of chorizo without the peel
- 40g of peeled garlic
- 1,5L almond milk
- 4g spigol (Spanish spices mix with 3% of safran)

Vegetable sauce:

- 25g of peeled garlic
- 30g shallot
- 400g can peas
- 15mL d'huile d'olive
- 75mL d'eau

Fish sauce:

- 160g shrimp
- 50g scorpionfish fillets
- 50gs cod fillets
- 0.5g spigol
- 150mL water
- 2g salt

Rice:

- 150g japonica rice (sushi rice)
- 375g water

Chicken:

- 150g chicken breast
- 40g water

Tempura paste:

- 200g flower
- 100g potato starch
- 15g smoked paprika powder
- 1g salt
- 2 egg yolks
- 300mL water
- 1L sunflower oil

Chorizo sauce:

- 100g sobresade
- 200mL water

Instruction:

1. **Almond milk reduction:**

- Cut the red pepper, the chorizo and the garlic into brunoise and place it into a saucepan.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

- Add the almond milk and the spigol.
- Place it under medium heat and let it reduce to half of its initial volume. (Around 30min)

2. Chicken mix:

- Cut the chicken into 5cm cubes.
- Boil until the center of the chicken rich 75°C.
- Mix it until the pieces are no larger than 2mm.
- Reserve it.

3. Vegetable sauce:

- Mince the garlic and the shallot.
- In a 20cm pan, add the peas, the garlic, the shallot and 50mL of water.
- Cover and let it simmer for 15 minutes under low heat.
- Transfer the mixture to a container and add 25mL of water.
- Mix everything using a blender until you obtain the smoothest texture possible. More water can be added if it is too thick.
- Pass the paste through a strainer to remove the skin of the peas. Reserve the fluid part.

4. Fish sauce

- Shell the shrimps
- Cut the scorpionfish and cod fillets into pieces of approximately 5cm
- Add the fishes, 100mL of water, salt and spigol into a 15cm saucepan.
- Let it cook at medium heat for 10 minutes (until the shrimps and the fishes are fully cooked)
- Transfer the mixture into a blander, add 50mL of water and mix it until you obtain an unctuous paste. More water can be added if it is too thick.
- Reserve the paste.

5. Rice

- Strain the reduced almond milk through a strainer. Collect the milk on one side and keep the pieces for the chorizo sauce on another side.
- Add the rice and the milk into a stainless pan and stir constantly with a spoon.
- Add water as it cooks to prevent it from sticking.
- Let it cook during 45 minutes.
- At the end of the cooking, add the chicken and let it cool down on a side of the kitchen.

6. Chorizo

- Into a blender, add the side pieces collected from the strained milk, the sobresade and the water.
- Blend until you obtained a smooth texture similar as the previous ones. Reserve it.

7. Tempura paste

- Mix into a bowl the flour, the potato starch, the smoked paprika powder and the salt.
- Add the egg yolks and the water.
- Mix it until you obtained a homogeneous tempura batter.

8. Rice tempura dip

- Using your hands or a mold, form with 30g of rice a shrimp shape.
- Coat the shrimp shape with tempura batter.
- Fry the coated rice in oil at 170°C for 8 minutes.

9. Dressing

- Order the rice-shrimp illusion in circle around a plate.
- Put the different sauce into bols
- Serve warm.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Recipe 2– Mini Brioche

Serves: 50 mini-brioche
Prep Time: 2h
Rest Time: 4h
Cook Time: 20min

Ingredients:
Brioche:

- 350g flour T55
- 60g sugar
- 3g salt
- 7g dehydrated baker's yeast
- 13g water
- 4 eggs
- 160g butter
- 1 egg yolk

Tropezienne cream:

- 500mL full-cream milk
- 1 vanilla pod
- 100g sugar
- 3 egg yolks
- 60g cream powder
- 0,2g orange blossom aroma
- 5g vanilla aroma
- 1 gelatin sheet 200 Bloom
- 200g whipping cream 30-35% M.F

Instruction:

1. **Brioche batter**

- In the mixer bowl, put the flour, salt and sugar.
- Dilute the yeast in lukewarm water (45 °C max.).
- Add the eggs and diluted yeast to the flour and mix with the hook (you should get a slightly sticky dough).
- After 8 to 10 minutes of kneading at low speed, the dough should be smooth and elastic
- Add the butter (at room temperature) cut into pieces and knead until it is completely incorporated.
- Place the dough in a cling film bowl
- Leave to rest for 1h30 at 27° C.

2. **Pastry cream**

- Preparation of the pastry cream
- In a 2-quart stainless steel saucier, combine milk and scraped vanilla bean along with its seeds. Bring to a bare simmer over medium heat. Remove from heat, cover to prevent evaporation, and let steep for 30 minutes.
- Whisk the yolks, sugar, the custard powder until mixture is pale yellow, smooth, and fluffy, about 1 minute.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

- Uncover infused milk and remove vanilla bean.
- While whisking continuously, slowly pour milk into egg yolk mixture in a thin stream, until all of it has been added.
- Return the mixture to the same saucier. Cook over medium heat, whisking constantly until pastry cream begins to thicken, about 5 minutes. Once it thickens, continue to whisk, pausing every few seconds to check for bubbles, about 1 minute. When it begins to bubble, set a timer, and continue whisking for 1 minute.
- Incorporate the gelatin, orange blossom and vanilla flavoring into the cream.
- Remove into a cling film plate and put in a cooling cell for 20 minutes.

3. Separation of the dough

- Degas the dough
- Spread on the floured work surface
- Cut out circles of dough and place on semi-spherical silicon molds
- Leave to rest for 1h at 27° C.

4. Whipped cream

- Whip the whipping cream with a whisk.

5. Aeration of pastry cream

- Soften the pastry cream by working it with a whisk
- Gently incorporate the whipped cream into the pastry cream
- Cooking of the brioche
- Bake for 20 minutes at 200 ° C

6. Assembly and dressing

- Once cooled, hollow out the brioche while keeping the circle of the cut
- Garnish with diplomat cream
- Close the cut with the brioche cap

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

INCLUSIVE AND FUNCTIONAL APPROACHES TO TRADITIONAL DISHES USING HYDROCOLLOIDS

ALCASO Sónia, ASSUNÇÃO José, BAPTISTA Sílvia, DE MEDEIROS Letícia, FALLAH Mobina, MARTINS Pedro, PAIXÃO Luccas, SLOMPO Marianna, SOMMAGGIO Verónica
NOVA School of Science and Technology, Monte da Caparica, Portugal
slompomarianna@gmail.com; pedrocittonm@gmail.com and v.sommaggio@campus.fct.unl.pt
**Corresponding author b.leite@fct.unl.pt*

Abstract
This abstract presents three Portuguese culinary innovations designed to address specific population needs. The first project reimagines *Arroz de Marisco*, a seafood-based dish, into a fully plant-based version using hydrocolloids and algae to mimic seafood texture and flavour, offering a safe and inclusive alternative for allergic or vegan consumers. The second project revisits the conventual sweet *Ovos Moles de Aveiro* through the Note-by-Note technique, creating an egg-free version suitable for individuals with egg allergies while exploring new textures and flavour profiles. The third project adapts *Cozido à Portuguesa* for patients with dysphagia, following IDDSI guidelines. Through the use of xanthan and gellan gum, traditional components were transformed into purées and molded gels that preserve the dish's nutritional value and cultural identity. Together, these projects combine food heritage with science-based tools to propose inclusive and functional reinterpretations of iconic Portuguese recipes.

Keywords: Food innovation, Portugal, Traditional dishes, Dietary restrictions, Hydrocolloids, Plant-based, Dysphagia

Marianna Slompo
Escola de Hotelaria e Turismo de Lisboa – EHTL
Marianna Slompo holds a Technical Degree in Culinary Arts from the Escola de Hotelaria e Turismo de Lisboa and a Bachelor's in Communication. She is currently pursuing a Master's in Gastronomic Sciences, with a research focus on the multidisciplinary nature of gastronomy and the innovation of food traditions. She teaches professional cooking and gastronomy-related subjects and is particularly interested in how traditional dishes can evolve without losing their cultural identity.

Pedro Martins
NOVA School of Science and Technology, NOVA University of Lisbon
Pedro holds a Bachelor's degree in Gastronomy from the Polytechnic Institute of Coimbra and is currently pursuing a Master's in Gastronomic Sciences, with a focus on innovation and the development of new food products. His academic journey reflects a deep passion for culinary creativity and a commitment to advancing the future of food through research and experimentation.

Funded by the European Union

Verónica Costa Sommaggio

NOVA School of Science and Technology, NOVA University of Lisbon

Verónica holds a Bachelor's degree in Animal Science and Technology from the University of Évora and a Master's degree in Food Safety and Technology from the NOVA School of Science and Technology.

She is passionate about food and is pursuing research on how different medical pathologies such as dysphagia, ADHD and autism affect the sensory perception food texture and taste.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Recipe nº1: *Arroz sem Marisco*

Component nº 1: Seaweed stock
Ingredients:

- 2 L water
- 20 g kombu seaweed
- 5-8 g dried sea lettuce (Ulva)
- 100 g diced onion
- 100 g sliced leek
- 100 g sliced celery

Preparation:
1. Combine all ingredients in a pot and bring to a boil.
2. Once boiling, reduce to low heat and simmer for 25 minutes.
3. Strain and reserve 1.6 L of stock.

Component nº2: Vegan shrimp
Ingredients:

- 600 ml water (divided into 300 ml for infusion + 300 ml for hydrocolloids)
- 10 g kombu
- 5 g dried sea lettuce
- 1.5 g xanthan gum
- 6 g gellan gum
- 6 g agar
- 50 g cooked yam
- 70 g tofu
- 20 g cassava starch
- 3 g salt
- 10 g dark miso
- 1.2 g calcium chloride
- 4 g iota carrageenan
- 5 g smoked paprika

Preparation:
1. Prepare the seaweed infusion: boil 300 ml water with the kombu and sea lettuce. Simmer for 20 minutes, then cover and let infuse for another 20 minutes. Strain.
2. Dissolve xanthan gum, gellan gum and agar in 300 ml water, and boil until fully hydrated.
3. Blend the yam until smooth. Add tofu, cassava starch, seaweed infusion, salt, miso, calcium chloride and the hydrated hydrocolloids from step 2. Blend until homogeneous.
4. Add iota carrageenan and blend for 5 more seconds.
5. Transfer the mixture to a saucepan over medium heat, stirring constantly. Once boiling, cook for about 5 minutes.
6. On a parchment-lined tray, sprinkle smoked paprika. Pour the mixture a shallow rectangular mold (~20×30 cm) to a height of 1 cm, then sprinkle more paprika on top.
7. Refrigerate for ~20 minutes. Once set, cut with a round mold (max. 10 cm diameter), then cut in half. Use scissors to make ~3 small cuts along the edge to simulate shrimp shape.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Component nº3: Vegan fish
Ingredients:

- 420 ml water (divided into 210 ml for infusion + 210 ml for hydrocolloids)
- 7 g kombu
- 3.5 g dried sea lettuce
- 2 g xanthan gum
- 6 g gellan gum
- 6 g agar
- 140 g pressed extra firm tofu
- 4 g salt
- 5 g miso
- 3 g calcium chloride
- 4 g iota carrageenan
- 5 g nori seaweed

Preparation:
1. Prepare the seaweed infusion with 210 ml water, kombu and nori, as in the shrimp recipe. Strain and set aside.
2. In a separate saucepan, dissolve the xanthan gum, gellan gum and agar in 210 ml water boiling until hydrated.
3. Blend the tofu, salt, miso and calcium chloride with the seaweed infusion and the hydrated hydrocolloids until smooth.
4. Add iota carrageenan and blend for 5 more seconds.
5. On a parchment-lined tray, place a sheet of nori seaweed. Pour the mixture into a shallow rectangular mold (~ 20×30 cm) to a height of ~1.5 cm.
6. Refrigerate for approximately 20 minutes. Once set, cut into 2 x 4 cm pieces.

Component nº4: – Rice
Ingredients:

- 30 ml olive oil (for sautéing)
- 10 g minced garlic
- 100 g diced red bell pepper
- 50 g chopped onion
- 400 g Carolino rice
- 150 ml white wine
- 1.6 L seaweed stock
- 5 g chopped parsley
- 5 g chopped coriander
- 60 ml olive oil (to finish)
- Zest of 1 lemon

Preparation:
1. In a pot, heat 30 ml olive oil and sauté the garlic, red pepper, and onion.
2. Add the rice and stir for about 2 minutes.
3. Pour in the white wine and stir until fully evaporated.
4. Add the seaweed stock and stir regularly for about 25 minutes, until rice is cooked.
5. Finish with chopped parsley and coriander, drizzle with olive oil and sprinkle lemon zest before serving with the vegan fish and shrimps on top

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Recipe nº2: *Ovos Moles de Aveiro* – Note-by-Note

Ingredients:

- 85 ml + 10 ml water
- 3 g gellan gum (1.2%)
- 11 g maltodextrin
- 27 g rice protein
- 1.2 g sucroester
- 0.3 g fine salt
- 50 g sucrose
- 51 g sunflower oil

Preparation:

1. **Gel base:** Heat 85 ml of water with gellan gum, maltodextrin, rice protein, sucroester, and salt. Stir continuously until fully hydrated and dissolved.
2. **Gelification:** Allow the mixture to cool down to enable the formation of a gel network. Do not incorporate the lipid phase or sugar syrup at this stage.
3. **Sugar syrup:** Boil 50 g of sucrose with 10 g of water until it reaches 117 °C (firm thread stage).
4. **Fluid gel:** Carefully add the hot syrup to the gel base and blend using an immersion blender. The heat partially melts the gel structure, resulting in a semi-fluid and stable texture.
5. **Emulsify:** Add the sunflower oil and blend again until a creamy, glossy, and homogeneous emulsion is achieved.
6. **Assembling:** Serve on its own, as a component of other desserts, or in the traditional wafers molded into sea related shapes: fill the wafers with the cream, smoothing the surface, and brush the edges with a little water; put the halves together, pressing the edges, and let them dry so the two sheets stick together. Store in airtight packaging.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Recipe nº3: Level 4 Dysphagia-safe *Cozido à Portuguesa*

Component nº1: Vegetable gnocchi

Ingredients:

- 100 g cooked, strained, and mashed vegetable of choice (such as potato, carrot, cabbage, turnip and leek)
- 1 g potato starch (1%)
- 0.5 g clear xanthan gum (0.5%)
- Salt, to taste – *quantum satis*

Preparation:

1. **Mise-en-place:** Peel and dice the chosen vegetables into small, even pieces.
2. **Cook:** Boil the vegetables in salted water until tender and easily pierced with a fork.
3. **Mash:** Drain well, then mash to a smooth purée.
4. **Incorporate dry ingredients:** Add the potato starch, xanthan gum, and salt to the warm purée. Mix thoroughly and let the mixture rest for about 5 minutes, allowing the starch and xanthan to hydrate. The purée should firm up slightly and hold its shape when pinched between your fingers.
5. **Shape the gnocchi:** Form into small pieces by hand, using the back of a fork, or with a silicone mold.
6. **Cook:** Drop the gnocchi into boiling water and cook until they float to the surface, about 3 minutes.

Component nº2: Consommé broth (light cabbage broth)

Ingredients:

- 15 ml olive oil
- 1 boneless, skinless chicken breast (~ 350 g)
- 1 medium carrot (~ 120 g)
- 1 small potato (~ 120 g)
- ½ of medium-sized Portuguese cabbage (~ 600 g)
- 1 small onion, unpeeled and well washed (~ 120 g)
- 1 garlic clove, whole (~ 5 g)
- 1.5 L cold water
- Bay leaf – *quantum satis*
- Clove – *quantum satis*
- Salt to taste (used moderately) – *quantum satis*
- Smoked paprika (optional) – *quantum satis*
- 1 medium egg white (~ 35 g)
- 0.4 % clear xanthan gum

Preparation:

1. Sauté: In a large pot, heat the olive oil and add the chicken breast, carrot, potato, cabbage, onion and garlic finely sliced. Sauté gently for 2–3 minutes to enhance their aroma.

2. **Simmer:** Pour in the cold water and add the bay leaf, clove, salt, and smoked paprika (if using). Simmer gently over low heat for about 1 hour and 20 minutes, avoiding strong boiling.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

3. Strain: Pass the broth through a fine cloth or gauze. Remove all solids to obtain a clear liquid.
4. Clarify: Whisk the egg white lightly, then mix with the warm broth. Heat gently without stirring and, when a white "cap" forms on the surface, strain again carefully to preserve clarity.
5. Reduce: Return the clarified broth to the heat and simmer until approximately 700 mL remains, concentrating the flavor.
6. Thicken: Using a hand blender, incorporate 0.4 g of clear xanthan gum per 100 mL of warm consommé.
7. Texturize: Blend the consommé into a smooth, homogeneous texture. Serve warm or at room temperature, with a spoon.

Component nº3: Rich meat broth
Ingredients:

- 15 ml extra-virgin olive oil
- 2 medium-sized pork cheeks (trimmed, excess fat removed, ~ 400 g)
- 1 medium ossobuco, bone-in with marrow (~ 200 g)
- 1 medium onion, unpeeled (~ 200 g)
- 1 medium carrot (~ 120 g)
- 1 leek stalk (~ 200 g)
- 1 garlic clove (5 g)
- 0.8 L cold water
- 1 bay leaf
- Small piece of kombu seaweed (~ 7x7 cm)
- 5 ml light soy sauce or mild white miso paste
- 5 ml mild balsamic vinegar
- 1.2 g clear xanthan gum (0.8%)
- 0.6 g sucroester (0.4%)

Preparation:
1. **Sear the meats:** In a deep pan, lightly sear the pork cheeks and ossobuco in olive oil until golden.
2. **Sauté:** Add the onion, carrot, leek, and garlic finely sliced and sauté for another 2–3 minutes.
3. **Simmer:** Add the cold water, bay leaf, kombu, soy sauce (or miso), and other preferred seasonings (if desired). Simmer gently for 2–3 hours (or 7-9 hours for deeper flavor), skimming impurities from the surface periodically.
4. **Strain and reduce:** Pass the broth through fine gauze, return to heat and reduce until ~150 mL of concentrated liquid remains.
5. **Season:** Add the balsamic vinegar. If desired, adjust with a touch more soy sauce or miso.
6. **Thicken**: Using a hand blender, incorporate 0.8 g clear xanthan gum and 0.4 g sucroester per 100 mL of warm broth.
7. **Serve:** Can be portioned into drops or applied in smooth dots on a plate. Final texture should be firmer than a runny liquid, glossy, and free of particles**.**

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Component nº4: *Chouriço* gel
Ingredients:

- 300 g cooked chouriço
- 500 g water
- 1.2 g low-acyl gellan gum (0.24%)
- Smoked paprika, black pepper, garlic powder and salt to taste – *quantum satis*

Preparation:

1. **Blend:** Combine the cooked chouriço with cold water and blend until completely smooth.
2. **Strain:** Pass the mixture through a fine cloth or sterilized gauze. This should yield a semi-clear, residue-free liquid.
3. **Hydrate**: Transfer the strained liquid to a saucepan and heat to 85–90 °C without letting the mixture boil.
4. **Incorporate gelling agent**: Gradually add the low acyl gellan gum while stirring continuously to avoid lumps.
5. **Activate the gel**: Simmer for 1–2 minutes to fully activate the gelling properties.
6. **Season**: Adjust taste with smoked paprika, black pepper, salt and garlic powder.
7. **Gelification**: Pour the liquid into molds or a shallow tray. Let cool completely until set.
8. **Cut and serve**: Once gelled, cut into small cubes for plating. Texture should remain firm and uniform.

Assembling:
The dish is assembled with a base of **consommé broth**, topped with colorful **vegetable gnocchi**, small cubes of **chouriço gel**, and finished with a few drops of the **rich meat broth** for flavor and contrast.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

ADAPTION OF A TRADITIONAL PANCAKE RECIPE TO A FORTIFIED PANCAKE RECIPE SUITABLE FOR DYSPHAGIA PATIENTS AT LEVEL 6 ON THE IDDSI SCALE.

DANILA Alexandru-Mihai, GILL Katie, O'BRIEN Marcus, SCANLON Callum, and WARD Sarah
TU Dublin students from the B.A. in Culinary Arts and the B.Sc. in Culinary Science
Sarahcward2@gmail.com
**Corresponding author roisin.burke@tudublin.ie*

Abstract
In this project-based learning assignment a traditional pancake recipe was adapted to make it suitable for consumption by people suffering from 'Dysphagia', which is a term used for swallowing disorders. The aim was to produce a pancake matching the International Dysphagia Diet Standardisation Initiative (IDDSI) level 6, also known as 'soft and bite-sized', but without compromising on the main sensory attributes of the dish. A siphon was used to produce a fluffy pancake, which was then soaked for 15 minutes in a liquid fortified with calcium and made from maple syrup, butter and milk. The pancake was pricked with a fork in several places to increase absorption of the liquid. Any excess liquid was removed before cutting the pancake into pieces no larger than 1.5 cm x 1.5 cm.

The dysphagia-friendly recipe was evaluated using fork and spoon pressure tests which confirmed its safety for level 6 Dysphagia patients. Sensory testing was carried out, by 14 panellists using a 9-point hedonic scale, on two product samples, (a traditional pancake and an adapted pancake) to determine if the recipe adapted from the traditional recipe was appealing for appearance, aroma, texture, pleasant aftertaste and overall acceptance. The results were analysed using a Student's t-test and revealed that apart from texture ($p<.05$) all other attributes were not significantly different ($p>.05$). The texture of the adapted pancake was much preferred over the traditional recipe.

Adaption of the traditional recipe using a siphon and an absorption step, enabled a level 6 IDDSI fortified pancake to be created with improved texture compared to a traditional recipe, while not compromising on appearance, aroma, pleasant aftertaste and overall acceptance.

Key words: Project-based learning, Dysphagia, Pancakes, Traditional

Sarah Ward
Presenter at the Summer School in Ljubljana, Slovenia (July 2025).
Final year degree student from the B.Sc. in Culinary Science

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Recipe: Aerated pancakes

Ingredients

- 2 egg yolks (from eggs that weigh 56-60g)
- 15ml | 1Tbs Milk
- ½ tsp vanilla extract
- 30g | 3Tbs All-purpose flour
- ½ tsp baking powder
- 3 egg whites (from eggs that weigh 56-60g)
- 1tsp white vinegar
- 50g | 1/4 cup Fine (or granulated) white sugar
- 7g | 2 tsp cornstarch

Method

Separate yolks and whites. Combine all ingredients besides the whites. Combine whites reducing aeration as much as possible. Put the batter in the syphon and pipe 30g straight onto the preheated pan with butter to reduce sticking. Flip occasionally and once finished, soak in 50ml of the fortified liquid for 30 minutes. To serve, display the pancake on a plate with a spoonful of the poached berries.

Recipe: Fortified liquid

Ingredients

- 50g butter
- 50g maple syrup
- 100ml whole milk
- 4 calcium tablets

Method

Melt the butter, maple syrup and milk in a pot at medium heat. Grind the calcium tablets in a mortar and pestle into a fine powder and add to the liquid. Stir the liquid until the calcium powder has dissolved.

The adapted pancake, with garnishes for sensory analysis, before cutting into 'soft and bite-sized' pieces no larger than 1.5 cm x 1.5 cm without garnishes and ensuring juices do not leak or drip from food.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

THE DEVELOPMENT OF A RECIPE FOR IDDSI LEVEL 6 DYSPHAGIA PATIENTS ADAPTED FROM A TRADITIONAL SPANISH RECIPE FOR A JAM SPONGE SANDWICH CAKE

DONLAN Katie, KUFEJI Kim, LEE Lindsey, LOPEZ GONZALEZ Antonio, MAHER Nathan, SOMERVILLE Abby
Final year degree students from the B.A. in Culinary Arts and the B.Sc. in Culinary Science
Nathan_maher@ymail.com
*Corresponding author roisin.burke@tudublin.ie

Abstract
Project-Based Learning (PBL) allows students to explore real-world problems and challenges while developing deep knowledge, and involves the design, development, and construction of hands-on solutions to a problem. PBL was the educational model used to allow for the development of a precise recipe with the aim to adapt it to specific needs of Dysphagia patients and at the same time achieve a reliable replication of the recipe.
A traditional Spanish recipe for a jam sponge cake was adapted for level 6 of the International Dysphagia Diet Standardisation Initiative (IDDSI), 'soft and bite-sized'. The recipe was for a simple sponge baked in the shape of cookies, using two of them with a jam filling to create a sandwich which could be cut into pieces no larger than 1.5 cm x 1.5 cm. It was inspired by the traditional Spanish "merienda", a snack time between lunch and dinner where a hot drink is consumed with a pastry. The recipe development was divided into different components: modified sponge, fruit filling (jam) with reduced sugar and added protein (collagen), Chantilly cream which was modified to form a stable foam, and sous-vide cooked fruit. Following cooking, 60g of the sponge mixture was weighed out and blitzed to a fine crumb in a robot coupe. The Chantilly cream was then added to the sponge and it was blitzed again until a fine paste was formed. This paste was then piped into two circular moulds lined with acetate and placed into a blast chiller to set slightly. The sponge paste was then removed from the mould and the acetate was removed. The sponge discs were then layered with the fortified jam between them and topped with a pear gel which was prepared from pears which had been cooked using sous-vide and the juice extracted from a paste. The pear juice was mixed with gelatine to form a gel which was used for the top of the cake. The fork and spoon pressure tests were carried out on the dish and confirmed acceptability for IDDSI level 6. Sensory evaluation of the attributes of appearance, aroma, texture, and flavour indicated that more development work was required to improve the adapted recipe.

Key words: Project-based learning, Dysphagia, Jam sponge cake, Traditional

Natan Maher
Presenter at the Summer School in Ljubljana, Slovenia (July 2025).
B.A. (Hons) in Culinary Arts

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Recipe: Jam Sponge Sandwich Cake

Reduced sugar sponge with cream
Ingredients (for original and tested modified recipes)

Recipe			
50	g	Plain flour	
25	g	Caster sugar	
2	pcs	Egg	
150	ml	Cream	
1	Tsp	Vanilla essence	

Method

1. Separate the eggs.
2. Whisk egg whites in a separate bowl until soft peaks are reached, add the sugar in three stages.
3. Whisk the egg yolk into the egg white mix.
4. Fold in the flour gently.
5. Spoon onto lined tray.
6. Bake in pre heated oven @175°C for 10 mins.
7. Remove and allow to cool before processing.
8. Cut top of sponge with a serrated knife.
9. Weigh out 60g of the sponge and blend to fine crumb in the robot coupe.
10. Weigh out 150ml of cream and add to the sponge crumb and blitz.
11. Pipe the mixture into ring moulds lined with acetate then chill before adding each component to create a circle shape to be stacked to make the cake.

Jam
Ingredients (for original and tested modified recipes)

Qty	Units	Ingredient	Brand (when applicable)
144	g	Strawberries	Keelings
45	g	Water	
10	g	Collagen (unflavoured)	Bulk
20	g	Flaxseed	
5	g	Lemon juice	

Method
Reduced sugar Jam:

1. Chop berries
2. Add to a pot and bring onto a low heat
3. Once the fruit begins to reduce, add sugar and lemon juice
4. Remove from heat and add collagen
5. blitz using a hand blender with collagen powder

Sugar-free jam

1. Chop berries
2. Add to a pot with lemon juice and a dash of water
3. Cook until soft.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

4. Remove from heat and blitz with collagen powder

Chantilly cream
Ingredients

- 500ml Cream
- 50g Icing sugar
- 10g Xanthan gum
- 10g Cornflour
- 1 Vanilla pod
- 2.5g hy-foamer
- 250ml almond drink
- 50g almond paste

Method
Recipe 1 – Control Chantilly

- 250ml cream and 25g icing sugar was added to a mixer and mixed on medium speed until soft peaks formed.

Xanthan Gum Stabiliser

- 5g of xanthan gum was mixed with 10 ml water using a hand blender.
- This mixture was the added to a mixer with 250ml cream and 25g icing sugar.
- This was mixed on medium speed until soft peaks formed.

Sous-vide fruit
Ingredients

Qty	Units	Ingredient	Brand (when applicable)
100	g	Drained pear purée (Bartlett pears).	N/A
250	g	Pear juice (drained from purée).	N/A
2	g	Lemon zest	N/A
1	g	Rosemary	Glendawn Herbs
1	g	Ground cinnamon	Verstegen
0.5	g	Allspice	Verstegen
3.7	g	Gelatine Platinum grade, leaf	Dr. Oetker

Method

1. Peel the pears, core them, and cut in chunks. Drizzle 15 ml of lemon juice over the chunks and toss to coat evenly. Leave to marinate for 10 minutes.
2. Zest the peel of a lemon.
3. Finely chop rosemary.
4. Finely grind allspice corns.
5. Blend the pear chunks without adding any of the marinade. There is no need to pat them dry.
6. Place the pear purée on a mousseline cloth sitting on a sieve over a bowl, enclose it within the cloth and drain off all the juices, collecting them in the bowl.
7. Weigh the pear purée and place it in a bowl. Add aromatics according to the ratios below and mix well.

Aromatic	%
Lemon zest	2%

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Ground cinnamon	1%
Chopped rosemary	1%
Ground allspice	0.5%

7. Place the mixture in a sous-vide bag, vacuum pack it, and cook in a sous-vide bath at 85°C for 30 minutes.
8. In the meantime, prepare the gelatine with the pear juice, using a 1.5% ratio of gelatine to liquid. Soak the gelatine leaves in cold water to hydrate it for 5 minutes, remove the gelatine from the cold water bath and squeeze off as much water as possible. Put the drained hydrated gelatine in a saucepan with the pear juice and bring it to a simmer over a low heat until the gelatine melts completely, preventing it from boiling.
9. Pour the pear juice and gelatine mixture on a tray with edges high enough to ensure a thin gelatine sheet and let it set at room temperature for 15 minutes to let it cool down. After that, the gelatine can be placed in the fridge to speed up setting.
10. Remove the pear purée from the sous-vide bath, open the bag and scrape all the cooked purée into a bowl, weighing it.
11. Add 100% ratio of gelatine to pear purée, mix thoroughly and pass it through a sieve. Spread the mixture on a tray and let it reset again.
12. Once set, cut a circle the same diameter used for the cake and place it on top of the cake.

A traditional Spanish recipe for a jam sponge cake adapted for IDDSI level 6 before cutting into ‘soft and bite-sized’ pieces no larger than 1.5 cm x 1.5 cm.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

FROM THE SPANISH OMELETTE TO SPANISH TAKOYAKI

CAMAÑA MARTÍNEZ Felipe, GARCÍA CEBRIÀ Carolina, NÁCHER VIVES Aina, SAN BARTOLOMÉ FERRI Andreu*, XIAOYAN Wu.
School of Agricultural Engineering and Environment, Universitat Politècnica de València, Spain
asanbart@gmail.com
**Corresponding authors xmartine@tal.upv.es and pugarse@tal.upv.es*

Abstract
In this project, we worked with one of the most iconic Spanish dishes: the *tortilla de patatas* (Spanish omelette). As a first step, we cooked the traditional recipe, following the classic method of cutting, frying, and mixing potatoes, onion, and eggs. This allowed us to understand the cultural value of the dish and also the scientific processes behind it, such as starch gelatinization, protein coagulation, and Maillard reactions that give the omelette its characteristic flavor and texture.
Once we mastered the traditional version, the challenge was to redesign the recipe for Generation Z consumers, who usually look for novelty, fun formats, and strong contrasts. For this, we transformed the omelette into small takoyakis, round bites cooked in a special pan, placed on toasted bread, and decorated with two sauces —aioli and brava— plus a topping of vacuum-fried onion for extra crunch. This step gave us the chance to apply more advanced techniques like emulsification, reduction, and vacuum frying, and to see how science can create new textures and flavors.
The final result was a creative dish that respected tradition but added innovation, color, and playfulness, showing us how gastronomy can connect history with new consumer trends.

Key-words: Culinary Science, Food and Technology, Creativity, Spanish omelette, Takiyaki, Innovation

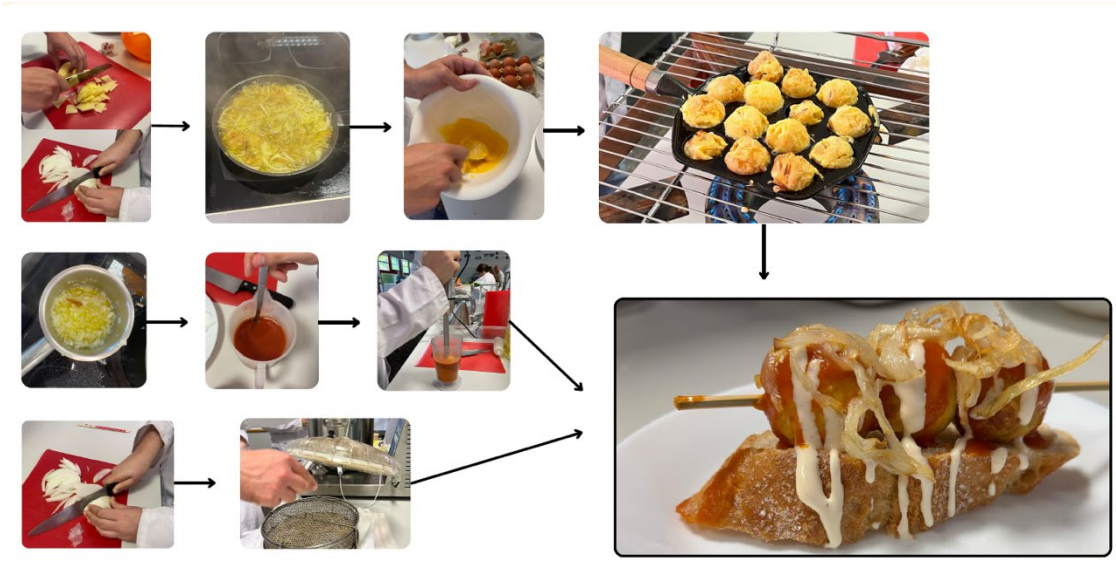
We are a group of curious and creative students from the School of Agriculture and Environment at UPV, enrolled in the subject Culinary Science for the Food Industry. We love experimenting, learning, and mixing science with flavor. This subject has challenged us to think differently about food—how it's made, how it tastes, and how it can shape the future. At this summer school, we are excited to share our ideas, discoveries, and a bit of our journey. We believe food is more than nutrition; it is innovation, culture, and fun.

Takoyaki potatoes team: from right to left Andreu San Bartolomé Ferri, Carolina García Cebrià, Aina Nácher Vives, Felipe Camaña Martínez, Wu Xiaoyan*

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Recipe: Spanish Takoyaki



Spanish Takoyaki recipe step by step

Introduction

This recipe reimagines the traditional Spanish potato omelette in the form of takoyaki, served with classic sauces — aioli and brava — and garnished with vacuum-fried onions. The new recipe employs various culinary techniques, including conventional frying, emulsification, reduction and vacuum cooking. The aim of these innovations is twofold: to present a traditional dish in a novel format to Generation Z consumers, and to gain an understanding of the chemical and biochemical basis of each technique employed. **2.**

Ingredients

Omelette Takoyakis:
-6 eggs-2 big potatoes-1 onion-Olive oil-Salt

Alioli sauce:
-1 garlic clove-1 egg-Sunflower oil-Salt

Brava sauce:
-1 garlic clove-Sherry vinegar-Tomato concentrate-200 mL vegetable stock-Sugar-Spices: cayenne, hot paprika and ground black pepper-Olive oil-Salt

Sides:
-Bread-1 Onion-Chives

Equiments: ceramic hob, gas stove, telectric mixer and Gastrovac.

Kitchen material: Takoyaki pan, chopsticks, frying pan, saucepan, piping bag, feeding bottle, knife, peeler, chopping board, sieve and skewer.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

To make Takoyaki

Peel the potatoes and place them in a bowl of water to remove the excess starch. Julienne the onion and slice the potatoes into thin strips. Fry both in plenty of oil, adding the potatoes first, followed by the onion. Beat the eggs and mix everything together with the fried onion and potatoes, seasoning with salt. Finally, place the mixture on the takoyaki grill and cook until it takes on its characteristic round shape.

(chopped potatoes and onions)

(frying it)

(beat eggs)

(mixing)

(preparing takoyakis in a specian pan)

Sauces elaboration

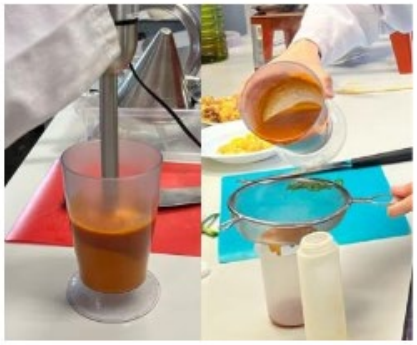
Alioli: Place one crushed garlic clove, one egg, salt and a dash of oil in the blender jug. Hold the hand blender steady at the bottom of the jug and blend continuously while slowly adding about 200 ml of oil until it emulsifies and the desired thickness is achieved. Leave the prepared sauce in a feeding bottle..

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

Brava: Begin by finely chopping the onion and mincing the garlic. Place both in a saucepan with the cayenne pepper and oil. Measure out 200 ml of vegetable stock, then add crushed tomatoes and cook until the mixture has thickened. Once the onion is golden brown, remove the cayenne pepper, then add the stock and tomato mixture to the saucepan along with the sherry vinegar and the remaining spices (hot paprika and ground black pepper). Leave to reduce for 20 minutes, stirring occasionally. After this time, taste the sauce and adjust the seasoning to your liking, adding sugar if it is too acidic. Once the sauce is to your liking, transfer it to a blender, blend, then strain.





Onion vacuum frying

Chopped finely julienne the onion and then vacuum-fry it using the Gastrovac. Place the onion on absorbent paper to make it crispier and absorb any excess oil.

(Gastrovac)

Plating:

Toast the bread to use as the base of the dish. Place three potato omelette takoyakis on top and secure them with chopsticks. Decorate with both sauces (aioli and brava) and finish with vacuum-fried onions.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.



Results

This well-executed dish combines Spanish tradition with modern techniques, appealing to the eye as well as the palate. The tortilla takoyakis are evenly browned and well formed. The toasted bread provides a crispy and stable base. The sauces (alioli and brava) are perfectly emulsified and applied with precision to provide a contrast of flavours. The vacuum-fried onion adds a crispy texture and a hint of sweetness without
any excess fat. This is an advanced technique. Overall, the presentation is attractive, with good colour harmony and balanced flavours.

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

VALENCIAN BOILED: MORE THAN COOKED VEGETABLES

DIEGO Claudia, EL BAQQALI Ilyas*, PAGES Noelia, TÉBAR Julia, TOSCA Andra.
School of Agricultural Engineering and Environment, Universitat Politècnica de València, Spain
elieselbaqqalimoncho@gmail.com
**Corresponding authors xmartine@tal.upv.es and pugarse@tal.upv.es*

Abstract
The 'hervido valenciano' is a traditional Valencian dish with strong links to the region's agricultural heritage. It reflects a historically simple and sustainable cuisine, using seasonal vegetables such as potatoes, carrots, green beans, and onions, which are boiled and dressed with olive oil and salt. This humble dish has long been a staple in Valencian households, particularly in times of scarcity, providing a nutritious and affordable meal.

For this project, the dish was reimagined using contemporary culinary techniques to appeal to Gen Z consumers, who value creativity, aesthetics, and sensory experiences. While maintaining the original ingredients, the updated version transforms their textures and presentation: onion petals arranged like a flower and filled with potato purée, complemented by carrot spheres and green bean foam created with a siphon. Techniques such as emulsification, precise cutting, and modern plating were employed to enhance the dish while preserving its essence.

This reinterpretation successfully bridges the gap between tradition and innovation, showing how classic recipes can evolve to meet modern expectations. It showcases the potential of culinary science to maintain cultural roots while embracing new trends in gastronomy.

Key-words: Culinary Science, Food and Technology, Creativity, Valencian boiled vegetables, Siphon, Foam, Innovation.

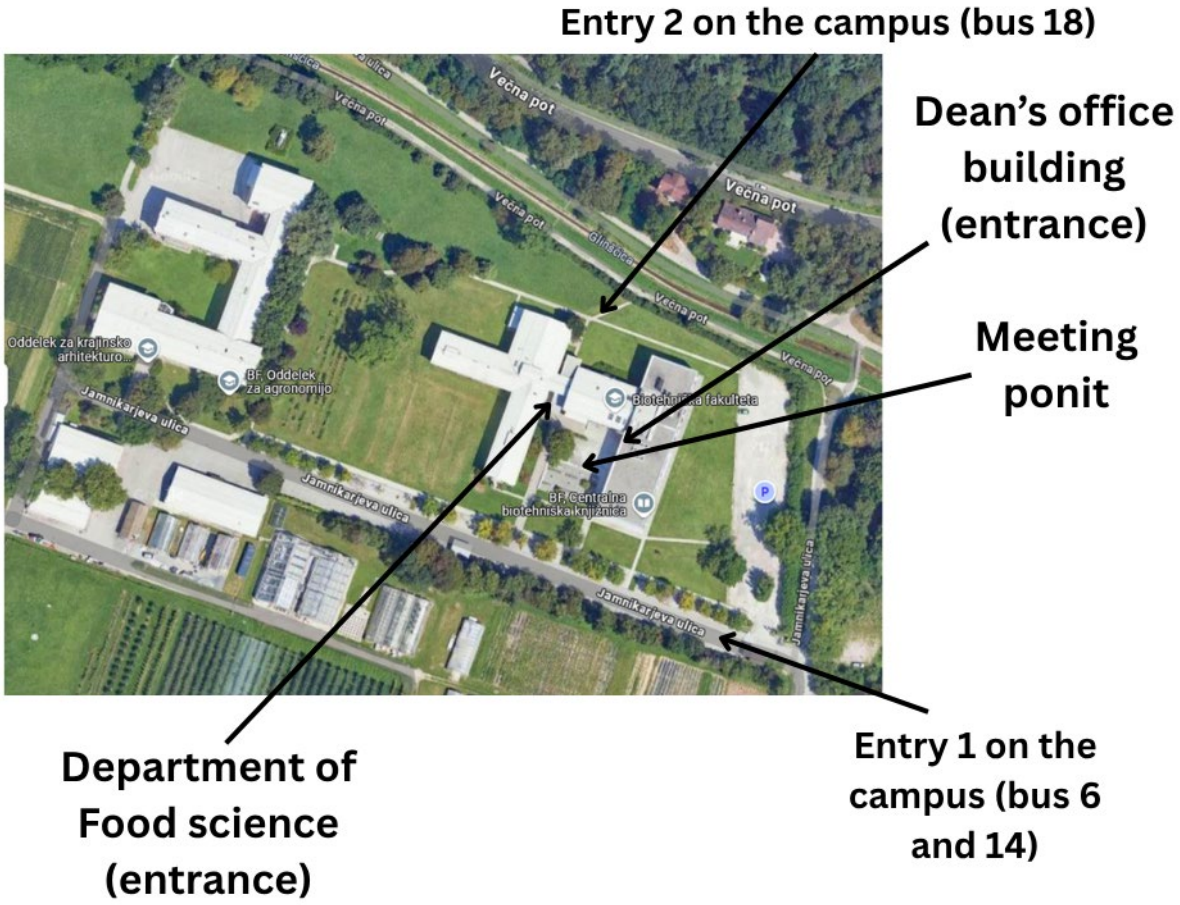
Hey there! We're a team of students from the School of Agriculture and Environment at UPV, currently enrolled in the Food Industry subject. This course has been a fun and eye-opening experience—we've explored how science and creativity come together in the kitchen. From weird experiments to tasty results, we've learned a lot and had a blast doing it. At this congress, we're excited to share our journey, the ideas we've cooked up, and how we see the future of food. For us, it's all about learning by doing—and enjoying the process!

Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.

LOCATION:

The summer school took place at the **Biotechnical Faculty, Department of Food Science and Technology**, located at **Jamnikarjeva 101, 1000 Ljubljana**. The department is situated in the building complex directly behind the main Dean's office building.



Funded by the European Union

Funded by the European Union. The content of this publication is the sole responsibility of the authors and the publisher. The European Commission is not liable for any use that may be made of the information.