



D4.1 Report on mapping current and potential international research and business alliances

April 2023

WP4 - Sustainability actions to step up and continuously grow UPWr's excellence



**Funded by
the European Union**

PROJECT SUMMARY

FOOD SENSORY SCIENCE RESEARCH.

The project aims is to improve the knowledge, skills, and competencies of the research and admin staff of UPWr in the field of the sensory evaluation of food and consumer behaviour with special attention to newly designed innovative processed food products with healthrelated properties. The project also aims to establish an international network among leading universities and centres in food sensory analysis to prepare competitive research applications/proposals within the EU and global challenges (UN SDGs).



The project aims to establish an international network of leading universities, centres in food sensory analysis and innovation consultants (SDU, UMH, BCC, REDINN) to step up in science and research, improving managerial and administrative capacities, networking skills and strategies to engage society and citizens as well as public authorities and private businesses, and regional and European institutions. SEASONED will enable FBFS and its partners, leading research institutions from Spain, Denmark, and Italy, to co-develop a capacity building programme to share and integrate expertise and skills to access new research avenues and develop new approaches to prepare competitive research applications within the EU and global challenges (Green Deal, UN SDGs). Implementing Gender Balance Monitoring, Open

Science, Citizen's Engagement, FAIR data research principles, and monitoring of Key Performance Indicators project will create short-to long-term societal, scientific, and economic impacts. Ultimately, UPWr's ambition is to develop and reach the top of the sensory evaluation centres' competencies and become the leading centre of excellence in Central and Eastern Europe (CEE). As a result, at the end of the project and far beyond the project duration, UPWr wants to establish a Consumer Behaviour Centre (CBC). SEASONED CBC will be a unique platform dedicated to scientists (ESRs including the MSc and PhD students, ERs, other scientists from national and international units), business partners and consumers from this part of Europe.

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¹ PU – Public, fully open (Deliverables flagged as public will be automatically published in CORDIS project's page),
SEN – Sensitive (limited under the conditions of the Grant Agreement Consortium and the EC)

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List of Abbreviations and Acronyms	
E3S	European Sensory Science Society
ESN	European Sensory Network
FBFS	Faculty of Biotechnology and Food Science
UPWr	Wroclaw University of Environmental and Life Sciences
SGGW	Warsaw University of Life Sciences
GUT	Gdansk University of Technology
PULS	Poznań University of Life Sciences
IARFR	Institute of Animal Reproduction and Food Research
PTAS	Polish Society for Sensory Analysis
SFAS	French Society on Sensorial Analysis
SISS	Italian Society of Sensory Sciences
WUR	Wageningen University & Research
WUR-FBR	WUR - Food & Biobased Research
TEAGASC	Agriculture and Food Development Authority of the Irish Republic
IPBRC	Institut Paul Bocuse Research Centre
PDO	Protected designation of origin

Executive Summary

D4.1, Report on mapping current and potential international research and business alliances constitutes a scene-setting document to provide the beneficiary with an initial identification of key European sensory sciences stakeholders. By the end of April 2023, we have identified 206 experts, mostly researchers, food technologists and managers, active within research organisations and companies in at least five distinct (and yet complementary) areas of investigation; Food Technology, Feeding Behaviour, Consumers Marketing, Nutrition, and Children.

The full list of stakeholders identified, with their affiliation, role and activity within European networks, is provided as a data-sensitive and restricted access annexe in an Excel file provided to the SEASONED Project Coordinator. The list will be subject to regular updates in the following months and treated in compliance with the GDPR, based on the provision of the project's Data Management Plan. As expected, based on information gathered in the course of the proposal preparation phase, the investigation of key active stakeholders reveals significant differences in the density of sensory science research organisations between the West of Europe, where the field is well-established and features relevant hubs in every country, and the East of Europe, where the research communities are smaller and less structured.

The mapping activity has brought the identification of two different networks, which show many commonalities in terms of interest and individual researchers or groups active in both. The E3S (European Sensory Science Society) is a federation of national associations composed mostly of scientific community members and structured in six working groups. The ESN (European Sensory Network) is an association of private companies, mostly multinational and focusing primarily but not exclusively on food products. Broadly speaking, cooperation within the E3S seems to be more open. At the same time, research and innovation projects being led in the framework of or by members of the ESN tend to be closer to the market, and their knowledge is more restricted.

The outcome of this phase of work is that FBFS is interested in following and positioning itself in respect of both networks, starting logically from establishing or consolidating linkages and cooperation with members of the E3S. To do so, however, FBFS should first gain or consolidate its status as a key player in sensory science in Poland. E3S is an association of national associations and not of individual organisations, though these are represented in the board or the working groups in which it is organised. We also recommend that FBFS set a development strategy based on three elements described in deeper detail in the Conclusions chapter, looking at the issues of diversification, credibility and networks.

Methodology

The rationale for investigating active networks and business players was to provide the SEASONED main beneficiary, FBFS, with a sufficiently comprehensive overview of the specific fields of research in the sector and how they are structured within active international networks in Europe. The logic was also to identify a first bulk (likely to be enlarged with further investigation and networking activities in the course of the project) of people and organisations that FBFS could get in contact with to explore opportunities for collaboration in different forms (joint research projects, knowledge exchange, mobility, etc.). This initial research has been carried out mostly based on desk research. To facilitate the processing of information and data acquired, the following five fields of interest have been identified: Food Technology, Feeding Behaviour, Consumers Marketing, Nutrition, and Children.

The research has focused on identifying, for each organisation or research group, the key people and their main field of expertise. Through research on key events, publications or projects, the investigation has also expanded to identify relevant networks, that is, recurring forms of partnerships between two or more research organisations. This information will prove key to adapting the future strategies of FBFS to identify and raise cooperation opportunities and involvement in innovative projects.

Two highly complementary networks have constituted the starting point for analysis, the European Sensory Science Society (the so-called E3S) and the European Sensory Network (ESN). More details are provided in the following sections on what differentiates them, how they complement each other and what research and innovation drivers guide their development.

Overview of the Food Sensory Science Community in Poland

Food Sensory Science is a subfield of sensory science that specifically focuses on the study of human perception, evaluation, and response to food stimuli. This field integrates knowledge from food science, chemistry, psychology, and neuroscience to understand the complex interplay between a food's physical and chemical properties and the sensory experiences they evoke. In Poland, the food sensory science community has grown rapidly in recent years, making significant contributions to industry and academia. This chapter explores Poland's food sensory science community, highlighting its historical development, key research institutions, notable researchers, and recent advances in the field.

Historical Development

Poland's food sensory science community has its roots in the broader sensory science field, which dates back to the early 20th century. The growing importance of food quality and consumer preferences in the Polish food industry during the latter half of the 20th century led to increased interest in food sensory research. As a result, Poland has seen the establishment of dedicated food sensory science research centres and academic programs in recent years.

Key Research Institutions

Several research institutions in Poland are dedicated to food sensory science, fostering collaboration between academia and industry. Some of the leading institutions include:

- 1. Warsaw University of Life Sciences (SGGW):** SGGW is a renowned institution in the field of food science, with a dedicated Department of Food Sensory Analysis. The department focuses on sensory evaluation methods, food quality, and consumer preferences.
- 2. Gdansk University of Technology (GUT):** GUT's Faculty of Chemistry houses the Sensory Analysis Laboratory, which researches food sensory properties, aroma compounds, and sensory analysis techniques.
- 3. Poznań University of Life Sciences (PULS):** PULS is home to the Department of Food Quality and Sensory Analysis, which investigates the relationships between food composition, sensory properties, and consumer preferences.
- 4. Institute of Animal Reproduction and Food Research (IARFR):** Affiliated with the Polish Academy of Sciences, IARFR hosts a Food Sensory Science Division that focuses on the sensory evaluation of food products, consumer preferences, and food quality improvement.

5. Wrocław University of Environmental and Life Sciences (UPWr): Faculty of Biotechnology and Food Science is one of the best in the field of food science in Poland. It focuses on developing novel food, sensory properties, and consumer preferences. UPWr has a sensory analysis laboratory and chemical labs equipped with modern machines, i.e., for volatile compounds (flavour) and texture profiling.

The history of food sensory science in Poland is shaped by the efforts and contributions of numerous researchers, academics, and industry professionals. While the field has grown and evolved significantly in recent years, the origins of food sensory science in the country can be traced back to a few pioneering individuals who laid the foundation for the discipline. This chapter highlights the key figures who initiated the study of food sensory science in Poland, shedding light on their achievements and the lasting impact of their work.

Pioneers of Food Sensory Science in Poland

1. Prof. Nina Baryłko-Pikielna (1930 – 2019): One of the founding figures of food sensory in Poland; for more than 50 years, her research was focused on the relationship between the units' sensory quality characteristics and overall sensory evaluation of the products, developing the mathematical concept determination of the coefficients of the importance of these features in shaping quality. Author of the first Polish book about sensory analyses, "Outline of sensory analysis food" (1975). The published work of prof. N. Baryłko-Pikielna is over 150 works that have appeared in national and foreign scientific periodicals. Thematic consistency of these works – almost they all concern the quality of food and sensory methods of its evaluation - and their originality made her a well-known and unquestionable authority in this field, not only in Poland but also abroad.
2. Prof. Jan Gawęcki: One of the founding figures of food sensory science in Poland, Prof. Jan Gawęcki was a prominent food scientist and nutritionist. He played a pivotal role in establishing the Polish Society for Sensory Analysis (PTAS) in 1994, which has since become a key professional organisation promoting the development of sensory science in the country. Prof. Gawęcki also contributed significantly to studying sensory analysis techniques and consumer preferences, helping shape the future of food sensory science in Poland.
3. Prof. Kazimierz Dąbrowski: Although primarily known for his work in general sensory science, Prof. Kazimierz Dąbrowski's contributions have significantly impacted the development of food sensory science in Poland. His research on the role of sensory experiences in personal development provided a foundation for understanding the importance of sensory perception in evaluating food products.
4. Prof. Maria Śmiechowska: As a pioneer in the field of food sensory science in Poland, Dr. Maria Śmiechowska has made significant contributions to understanding the relationships between food composition, sensory properties, and consumer preferences. Her work on the sensory and chemical properties of food products, particularly in the context of food quality and safety, has had a lasting impact on the field.
5. Prof. Eliza Kostyra is a distinguished researcher and academic in food sensory science, currently working at the Warsaw University of Life Sciences (SGGW) in Poland. With a strong focus on food quality and sensory analysis, her research interests encompass the complex relationships between food properties, sensory experiences, and consumer preferences. Prof. Kostyra has published numerous research articles in leading scientific journals, and her work has been instrumental in advancing food sensory science in Poland. In addition to her research, she is committed to educating the next generation of food scientists and has been actively involved in teaching and

mentoring students at SGGW. Prof. Kostyra's expertise and dedication have significantly contributed to the growth and development of Poland's food sensory science community and beyond.

These pioneering figures have played a critical role in shaping the development of food sensory science in Poland, laying the groundwork for future generations of researchers and professionals. Their work has contributed to the growth of the discipline, both domestically and internationally, and has had a lasting impact on the understanding of sensory perception in relation to food products.

Recent Advances

Polish food sensory scientists have made significant strides in recent years, contributing to industry and academia. Some key advances include:

- Developing and refining innovative sensory evaluation techniques, such as temporal dominance of sensations (TDS) and rapid profiling methods, allow a more efficient and accurate assessment of food sensory properties.
- Research on the influence of food product packaging and presentation on consumer perception and preferences, helping food manufacturers design more appealing products.
- Investigations into the sensory properties and consumer preferences of traditional Polish food products, such as fermented foods and regional specialities, promote and preserve the country's culinary heritage.

Identification of Key Institutional Stakeholders in Food Sensory Science in Poland

In Poland, the field of food sensory science is regulated and supported by several key institutional stakeholders, which include ministries, national agencies, and other organisations. These institutions play a vital role in ensuring the safety, quality, and sustainability of food products while promoting innovation and research in food sensory science. This chapter identifies the main institutional stakeholders in the Polish food sensory science landscape and provides an overview of their roles and responsibilities.

Ministries

1. **Ministry of Agriculture and Rural Development:** This ministry is responsible for overseeing the agricultural sector and food industry in Poland, which includes developing and implementing policies, regulations, and strategies to ensure the safety and quality of food products. The Ministry of Agriculture and Rural Development supports research and innovation in food sensory science through funding and collaboration with research institutions.
2. **Ministry of Health:** The Ministry of Health ensures public health and safety, including regulating food products. This ministry is responsible for establishing guidelines and standards for food safety, nutrition, and labelling, all of which directly impact food sensory science research and applications.

National Agencies

1. **Chief Sanitary Inspectorate (GIS):** GIS is a government agency responsible for overseeing public health, including food safety and quality. The agency monitors and enforces food safety

regulations and standards, ensuring that food products meet the sensory and safety requirements set by Polish and European Union legislation.

2. **National Centre for Research and Development (NCBR):** NCBR is a key agency that supports and promotes research and innovation in various fields, including food sensory science. The agency provides funding for research projects and fosters collaboration between academic institutions and industry partners to advance food sensory science in Poland.
3. **Polish Accreditation Centre (PCA):** PCA is responsible for accrediting laboratories, inspection bodies, and certification bodies involved in food sensory analysis. By ensuring the quality and competence of these organisations, PCA plays a vital role in maintaining the credibility and reliability of food sensory evaluation in Poland.
4. **Agricultural and Food Quality Inspection (IHMARS):** IHARS is a government agency responsible for supervising and controlling the quality and safety of agricultural and food products, including sensory properties. The agency monitors compliance with Polish and European Union regulations and standards and supports research in food sensory science to improve food quality and safety.
5. **The Agency for Restructuring and Modernisation of Agriculture/Agencja Restrukturyzacji i Modernizacji Rolnictwa (ARiMR)** is a Polish governmental agency dedicated to the restructuring and modernisation of the agricultural sector. While their primary focus is on agricultural development, they also support research and initiatives related to sensory science, aiming to enhance food products' quality, taste, and overall sensory experience. By providing funding, training, and resources for research projects and collaboration, ARiMR helps to advance sensory science and foster innovation in the food and agriculture industries.
6. **The National Agriculture Support Centre/Krajowy Ośrodek Wsparcia Rolnictwa (KOWR)** is a national centre for agricultural support in Poland. Its mission is to promote sustainable development and competitiveness within the agricultural sector. KOWR plays a significant role in sensory science, as it supports research, development, and education initiatives that focus on improving the sensory attributes of agricultural products. By collaborating with other institutions, KOWR seeks to create innovative solutions to enhance the sensory qualities of food, ensuring better consumer satisfaction and overall market success.
7. **National Science Centre/Narodowe Centrum Nauki (NCN)** is a leading Polish research funding organisation that supports scientific projects across various disciplines, including sensory science. The NCN provides grants and resources to researchers working in the field, enabling them to advance their knowledge and contribute to understanding how sensory factors influence consumer behaviour and preferences. By fostering collaboration between researchers, institutions, and industries, the NCN aims to promote the growth and development of sensory science in Poland and beyond.

Other Organisations

Research Institutes and Universities: Various research institutions and universities in Poland, such as Warsaw University of Life Sciences, Gdansk University of Technology, and Poznań University of Life Sciences, contribute to the development and regulation of food sensory science through research, education, and collaboration with government agencies and industry partners.

The Faculty of Biotechnology and Food Science at Wroclaw University of Environmental and Life Sciences

The Faculty of Biotechnology and Food Science (FBFS) at Wroclaw University of Environmental and Life Sciences (UPWr) is a leading institution in Poland for research and education in food science, biotechnology, and food sensory science. Established in 1976, the FBFS has become a hub for cutting-edge research, fostering collaboration between academic institutions, industry partners, and government agencies. This chapter provides an overview of the FBFS at UPWr, focusing on its contributions to food sensory science in Poland, and highlights the work of Prof. Agnieszka Kita, Dr Malgorzata Korzeniowska, and Dr Anna Michalska-Ciechanowska.

The FBFS at UPWr offers a range of undergraduate, graduate, and doctoral programs in food science, food technology and biotechnology. The faculty is organised into several departments, including the Department of Food Storage and Technology and the Department of Functional Food Products Development, which plays a central role in food sensory science research and education at the institution. Researchers at the FBFS conduct studies on various aspects of food sensory science, such as sensory evaluation techniques, food quality and safety, consumer preferences, and the relationships between food composition and sensory properties.

The FBFS also actively collaborates with industry partners and government agencies, providing expert knowledge and support for developing innovative food products and processes that meet consumer needs and expectations. Through its research activities and educational programs, the FBFS contributes to the growth and development of Poland's food sensory science community and beyond.

Prof. Agnieszka Kita

Prof. Agnieszka Kita is a prominent researcher and academic at the FBFS, specialising in food technology. Her work focuses on the sensory properties of food products, particularly in relation to their chemical composition and the impact of processing techniques and storage conditions on sensory quality. Prof. Kita has published numerous research articles in the field and has been instrumental in promoting food sensory science at UPWr and within the broader Polish scientific community.

Dr Malgorzata Korzeniowska

Dr Malgorzata Korzeniowska is a distinguished researcher and lecturer at the FBFS, with expertise in food sensory science and consumer preferences. Her research explores the relationships between the sensory properties of food products, consumer preferences, and the factors that influence these preferences, such as cultural, demographic, and psychological factors. Dr Korzeniowska's work has contributed to developing innovative food processing technologies that maintain or enhance the sensory quality of food products while ensuring their safety for consumption.

Dr Anna Michalska-Ciechanowska

Dr Anna Michalska-Ciechanowska is a respected researcher and educator at the FBFS, focusing on food technology involving sensory science. Her research interests include investigating the effects of food processing and preservation methods on the sensory properties and safety of food products. Dr Michalska-Ciechanowska's work helps bridge the gap between sensory science and consumer behaviour, providing valuable insights for developing food products that meet consumer needs and expectations.

Dr Agnieszka Nemś

Dr Agnieszka Nemś is a young researcher at FBFS focusing on sensory science and consumer behaviour. Her interest includes investigating the effect of raw material and technological parameters on the quality of plant food products enriched in biologically active compounds.

Key Industrial Stakeholders in Food Sensory Science in Poland

The food industry in Poland is diverse and dynamic, with numerous companies engaging in food production, processing, and distribution. These industrial stakeholders play a crucial role in the application and advancement of food sensory science by collaborating with academic institutions like the Wrocław University of Environmental and Life Sciences (UPWr). This chapter identifies and describes key industrial stakeholders in Poland that may utilise UPWr's knowledge in food sensory science to enhance their products and processes.

Key Industrial Stakeholders

1. **Maspex Group:** Maspex is one of the largest food processing companies in Poland and Central Europe, producing a wide range of products, including juices, beverages, pasta, and canned goods. The company may collaborate with UPWr to improve the sensory properties of their products, develop innovative processing techniques, and gain insights into consumer preferences.
2. **Wawel SA:** Another significant player in the Polish confectionery market, Wawel produces a range of chocolates, candies, and other sweets. Wawel may benefit from UPWr's food sensory science expertise to refine their products' sensory properties, develop innovative confectionery offerings, and gain insights into consumer preferences.
3. **Sokołów S.A.:** As a major Polish meat processing company, Sokołów S.A. produces a variety of meat products, including sausages, hams, and ready-to-eat meals. The company may collaborate with UPWr to improve the sensory properties of their products, enhance the taste and texture of meat products, and better understand consumer preferences in the meat market.
4. **Sante Sp. z o.o.** is a family company established in 1992. Sante is known for the quality of its products and the particular care it takes in giving customers foods that are best for their health. Today, the company is an expert in the healthy foods market in Poland and worldwide. Its rich and diversified offer includes ca. 250 products, including breakfast products, cookies, bran, wheat bars, groats, nuts and dried fruit, vegetable spreads and terrines, and beverages. Among the unique products offered by Sante are premium quality, high-fibre oat bran, low-sodium sea salt, Granola, Fital, Musli Lo, Smart Teens - breakfast cereal for children, and the GO ON! brand (GO ON! Peanut butter: 100% peanuts, GO! almond butter: 100% almonds, GO ON! protein bars), or the "Treasures of the Earth" series with superfoods. The high quality of the products, with no artificial additives, is the pride of Sante.
5. **Colian Holding S.A.** is a Polish family business delivering high-quality products to the market under the name of brands known in Poland and abroad. A leading enterprise with Polish capital in the confectionery market, competing with international corporations. It specialises in producing, distributing and selling food products in the confectionery, beverage and spice industries.
6. **Tarczyński S.A.** is a Polish modern meat processing company. They take special care of the sensory aspects of their products. A combination of top quality, family tradition and passion for offering the best products. Tarczyński brand, where meat products are at the centre of things.

University-Industry Collaboration and Shared Business Opportunities

Wroclaw University of Environmental and Life Sciences (UPWr) has the potential to create valuable partnerships with industry stakeholders to develop innovative solutions and applications in food sensory science. This chapter outlines the possible offerings the university may develop for industry partners and highlights shared interests in business opportunities.

University Offerings for Industry Partners

1. **Sensory evaluation services:** UPWr may offer sensory evaluation services to industry partners, using their expertise and facilities to assess the sensory properties of food products. This collaboration may help companies refine their products and better understand consumer preferences.
2. **Product development support:** UPWr may support developing new food products or improving existing ones, using their knowledge of sensory science to optimise taste, texture, aroma, and other sensory properties.
3. **Workshops and training:** The university may offer workshops and training programs for industry professionals, providing education on sensory analysis techniques, consumer preferences, and the role of sensory science in product development.
4. **Research collaboration:** UPWr may collaborate with industry partners on research projects to explore new technologies and techniques in food sensory science and investigate consumer preferences and behaviours.

Shared Interests and Business Opportunities

1. **Enhancing food product quality:** Both the university and industry stakeholders are interested in enhancing the sensory quality of food products, ensuring they meet or exceed consumer expectations.
2. **Consumer insights:** Gaining insights into consumer preferences and behaviours can help both parties develop food products that cater to market needs and increase the likelihood of success in a competitive

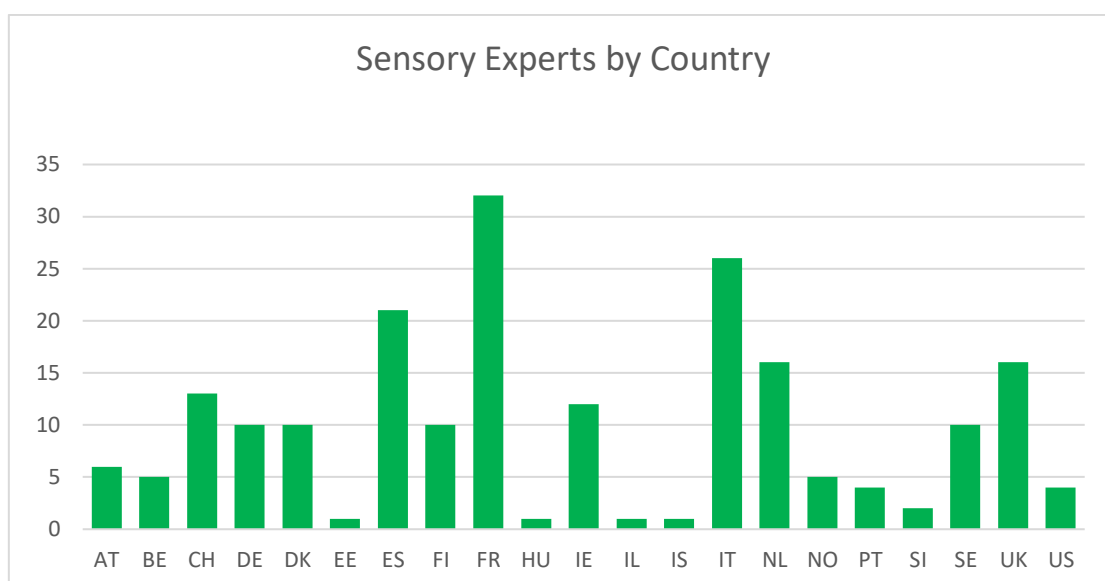
Overview of the Food Sensory Science Community in Europe

General Introduction

Our investigation has identified 206 individuals active in sensory science-related subjects, focusing mostly on the E3S (European Sensory Science Society) and the ESN (European Sensory Network), the two main associations on Sensory Science in Europe. Most of those individuals are researchers or managers in charge of research and innovation policies within their organisations. While the results of this activity are still partial and will be integrated into the course of the project with further mapping at the European level, the data obtained show the concentration of research or knowledge nodes in some regions of the EU, in some cases corresponding to specialisations in specific sub-fields of sensory science.

Although research organisations, private companies and individual experts are present in almost all countries in the continent, the higher density is to be found in Western Europe, particularly in France, the UK, Italy, the Netherlands, Spain and the Scandinavian countries (Denmark, Norway, Sweden and Finland). This scientific field is still in its infancy or insufficiently structured in most Eastern European countries or the countries of most recent adhesion to the EU (see Graph 1). As of today, the only most recently

accessed country of the EU within the E3S is Slovenia, whose association was integrated into the network in 2022.



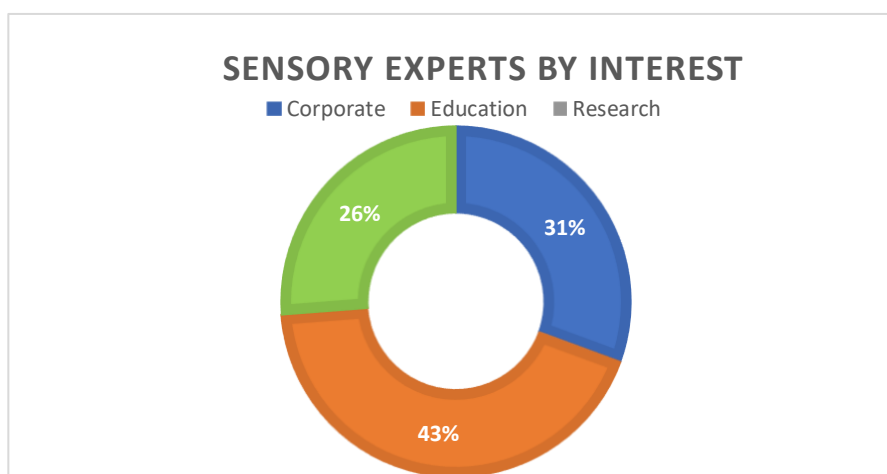
(Graph 1 – This data is based on the identification of 206 experts, internationally following research led in the first six months of project implementation)

The sensory research landscape in Europe can be divided into three broad categories of experts:

- a) university or higher education researchers (ref. as 'Education')
- b) researchers working primarily for public authorities, research centres or other non-profit sensory organisations (ref. as 'Research')
- c) researchers working for industry and enterprises (ref. as 'Corporation')

This research has divided the sensory scientists into one of these three categories (see Graph 2). This classification is purely indicative of the main interest of each researcher. Each expert is often active in one or more of the mentioned areas of interest.

From the data collected, almost half of the sensory scientists are fully engaged in higher education. They work for universities and carry on activities of research and teaching. The rest of the sensory expert community is evenly split. Some researchers are fully engaged as advisors for the industry and corporate sector, and others are fully engaged in research centres providing knowledge for public institutions or national governments.



(Graph 2 – A majority of experts have been identified in universities, mainly within Food Technology and Nutrition Faculties or Departments)

As in many other areas of science, the European landscape of sensory science networks appears to be divided into two main fields.

1. *Fundamental research*: Sensory science actors orient their research intending to provide national authorities with knowledge on food science and the feeding habits of the population according to age ranges or other parameters. The main scope of this approach is to broaden the knowledge base to help national governments promote healthy habits and/or enhance food safety or to analyse, understand and manage new trends.
2. *Market-oriented research*: Research actors active within food companies concentrate mostly on new products and processes, where products can also be intended as single compounds, proteins or ingredients that are eventually integrated into a processed final product. In this case, the awareness of policy trends is fundamental in defining the boundaries within which to develop products or marketing approaches. Several companies are engaged in fundamental research and are increasingly paying attention to sustainability issues in relation to the composition, value chains and the ethical dimension of new food products.

The following paragraphs present a deeper insight into the composition, structure and working methods of national and international sensory science networks in both the mentioned fields of research.

E3S and the national networks

The European Sensory Science Society (E3S) is a non-profit organisation (NPO) founded in Italy in 2011. It currently counts members from 11 EU member states (Austria, Denmark, Ireland, Italy, Finland, France, Germany, Norway, Slovenia, Spain, Sweden, and the Netherlands), Switzerland, and the United Kingdom. In 2015 also Ireland joined the E3S, and in 2022 E3S welcomed Slovenia.

The organisation brings together, on the international level, other national organisations that operate in sensory science in Europe. E3S is marked by a strong scientific and research approach to grow Sensory Science through the creation and enhancement of active cooperation of sensory scientists. E3S is a platform for scientists and researchers to partner and carry out research projects, disseminate their results, and promote collaborative educational activities such as Master's degrees and training courses.

E3S is divided into several working groups to facilitate the discussion and exchange of ideas among its members to focus on and find solutions to specific challenges in sensory sciences. Once set up, each working group can organise meetings (seminars, workshops, etc.), coordinate cross-border research activities and produce deliverables.

There are currently there six working groups:

- **Education WG**: it includes 21 members from 13 countries who act as a trait-d-union between their domestic universities or national Sensory societies and E3S. The data they collect are shared and exploited to issue reports and publications and develop training curricula and university courses.
- **Children WG**: focuses on researching the mechanisms influencing children's sensory perception and food preferences to develop methodologies appropriate for data collection from the target

group. The group includes 40 members from 14 countries; 37 are female, and only 3 are male.

- **Taste sensitivity:** the group aims to investigate the role of taste sensitivity (TS) on food preference and food-related behaviour. Its research focuses on determining the best methodologies and indicators to evaluate taste preferences and how these affect people's feeding behaviour and choices. The Italian Sensory Science Society (SISS) represents the largest share in the composition of this WG, with 11 members out of 33.
- **PDO WG** aims to promote the knowledge of and application of sensory analysis on PDO products (Protected Designation of Origin). It counts 58 members from 13 countries, 46 of which are female. The largest share of its members comes from Spain (16), Italy (12), and France (9), denoting a strong interest in researching synergies between sensory science and food traditions.
- **Next Generation WG** is designed to support Sensory Science students and young researchers to establish a network and spread their research work to the wider professional sensory community. The all-female five-person Committee manages the E3S website and organises events dedicated to students and PhD candidates within wider sensory science conferences.
- **Non-Food WG:** the group aims at exploring, developing, and improving research practices in non-food sectors (e.g. packaging). And it is the group that works the closest with the industry in marketing and consumer behaviour. Most of its members (11 out of 16) represent the French Society of Sensory Analysis (SFAS), with only 3 members.

Within E3S, all the member societies appoint 2 official delegates for the general assembly. Nevertheless, the composition of E3S Working Groups varies in size. While Next Generation WG only consists of 5 board members, PDO WG is the largest and reaches the number of 58 members.

WG members come from different countries, with France and Italy being the most active members.

Whereas all the E3S members contribute to the activities of the organisation, a special focus can be dedicated to the French and the Italian Sensory Societies:

- **SFAS (France):** The French Society on Sensorial Analysis aims to bring the operators of sensory evaluation (sensory and/or consumer sciences) together. Its main objective is to promote the sensory profession by collecting, disseminating and exchanging information on sensory science between members. The work covers all the ranges of sensory science, including the non-food sector. The Society is divided into seven Working Groups, the most important of which (WG7) carries out activities on methodologies. Within E3S, many of its members are particularly active in sensory science applied to the non-food sector.
- Moreover, SFAS also organises conferences and training courses for sensory experts and industries. Currently, SFAS is involved in the internal **VocaConso project**, which aims at identifying sensory terms to ensure clear and effective communication with consumers.
- **SISS (Italy):** The Italian Sensory Science Society (SISS) is a non-profit scientific and professional organisation that brings together Italy's leading sensory science experts. The aim of SISS is to promote and disseminate scientific research in sensory science. The association operates through five working groups that meet regularly during the year to coordinate and share their research findings.

SISS has engaged in a dense activity of dissemination of knowledge throughout the organisation of training courses, workshops and seminars in Italy and abroad. SISS is also one of the founding members of the E3S network.

In 2015, SISS launched a three-year research project, **Italian Taste**, aimed at studying the food preferences of Italians.

More info on ITALIAN TASTE on <https://scienzeensoriali.it/en/italian-taste/>

E3S periodically organises a series of meetings of its representatives to coordinate research efforts and exchange data, best practices, and ideas. The coordination efforts of E3S have so far made possible the creation of 115 courses (59 Bachelor of Science and 56 Masters) in 46 European Universities, with teaching in 9 languages. Moreover, E3S organises yearly seminars, targeted workshops, training courses and ad hoc conferences to spread the newest findings in sensory science.

Scientific Excellence and Research Areas

E3S activities are characterised by a strong focus on knowledge-oriented research. Its member sensory societies are directly related to Universities and public institutions and work mostly, but not exclusively, to advance the subject of Sensory Science. One of the main challenges in sensory science is finding indicators and methodologies that can accurately measure qualitative analysis.

Scientific research can be classified into five areas, all strongly interconnected with each other (and often overlapping) but with different scopes.

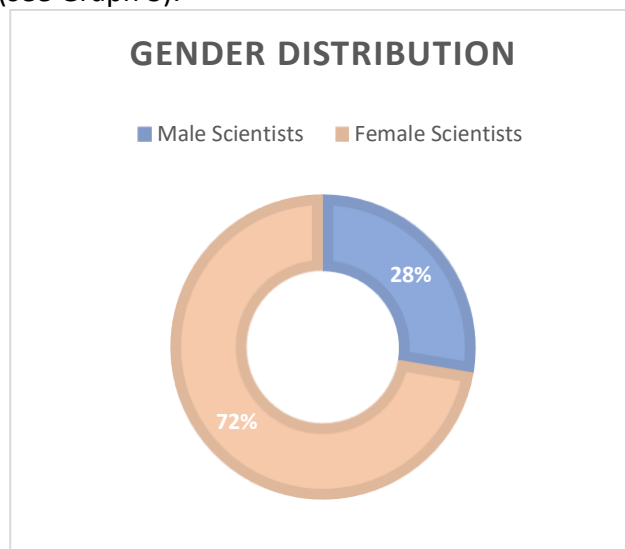
Research Areas:

- **Feeding habits:** this area of sensory science investigates what drivers orient (consciously or subconsciously) people's preferences in food intake. The choice of what food to eat is driven by a series of factors other than flavour only. The brain shapes feeding preferences by considering different stimuli, such as the visual presentation, the texture, and the smell of the food. By understanding the weight of these stimuli, researchers can develop better methodologies that can explain feeding patterns in different segments of the population. The outcomes of this type of research can help a business target its clients.
- **Food Technology:** Food technology is a branch of food science that deals with the production, preservation, quality control, research, and development of new food products. Sensory science intervenes in this context to investigate the factors that must be taken into consideration in the designing and making of innovative foods. A precise analysis of perceptions towards food can help a business launch its new products on the market.
- **Nutrition:** A healthy, well-balanced diet is key to a better lifestyle. Synergies between sensory science and nutrition represent a powerful tool for health policies. The understanding of drivers that shape feeding preferences can be used by authorities and policymakers to balance the encourage healthier feeding habits and address well-being campaigns. Moreover, sensory science can enhance food safety by identifying characteristics to counter agri-food fraud.
- **Consumers and Marketing:** Sensory food science is a considerable asset for companies. Results yielded from the research in this field can be used to set and achieve strategic and financial goals. Sensory science also represents a useful tool in studies on product shelf life, quality control, development and optimisation of new products, and flavour profiling.

- **Children:** Research on food sensory science covers the entire spectrum of the population. Nevertheless, children represent a particular focus group due to the multi-disciplinary approach it requires. Several sensory scientists address their research on how sensorial stimuli and perception can shape children's choices in feeding and how these preferences change with ageing. For health experts, sensory-based food education is associated with children's willingness to choose and eat more fruits and vegetables, thus improving their well-being. For food companies, children represent a particular target group worth investing in.

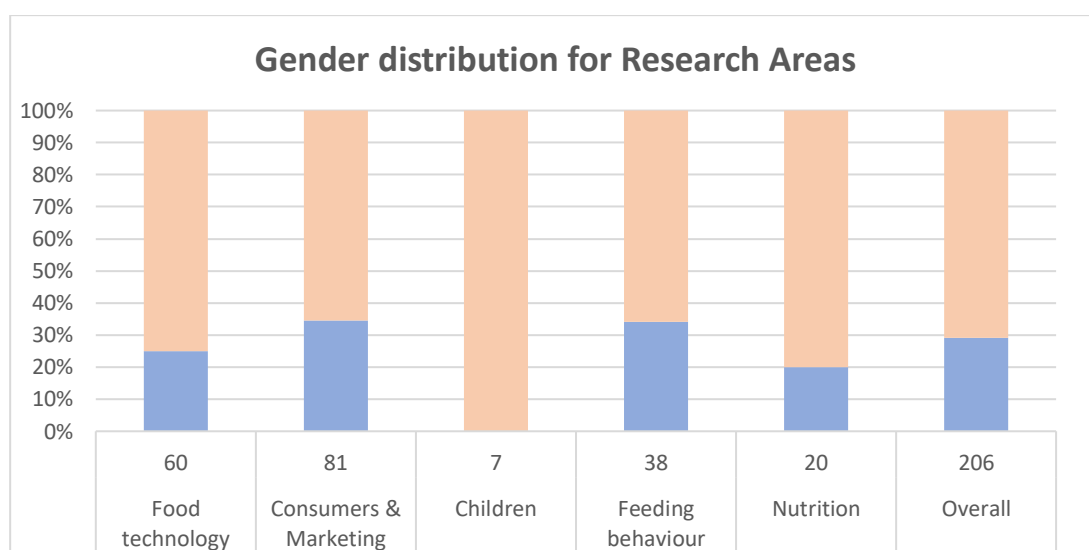
Gender dimension

From a gender perspective, this research reveals a remarkable presence of women sensory scientists and experts. Overall, out of the 206 sensory scientists and professionals identified in this research, almost three-quarters are women (see Graph 3).



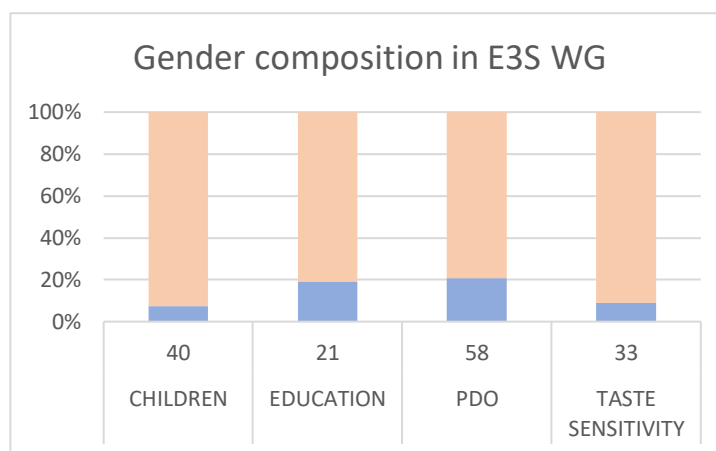
(Graph 3)

A majority of women expert is registered in all the research areas identified, with only one exception: scientists whose main research topic is 'children' are entirely women. In other research areas, male scientists are present within a range from 9,1% up to 34,2% (see graph 4).



(Graph 4 – Gender distribution presents a similar male-female ratio in all the Research Areas, except 'Children')

A similar trend is also registered within E3S Working Groups. The board of E3S Next Generation WG is composed entirely of women. Even the other Working Groups (Children, Education, PDO, Taste Sensitivity) count a strong majority of women in their compositions, within a range between 79,3% to 92,5% (see graph 5). It is important to notice that one expert can be present in two or more WG.



(graph 5)

ESN and the industrial stakeholders

Whereas E3S focuses on fundamental research and brings together the efforts of the academic world, another European network on sensory science presents stronger ties with the industry and has a market-oriented approach to its work.

Founded in 1989, the European Sensory Network (ESN) was, by that time, the largest international network of sensory and consumer sciences. It brings together academics, research institutions and industrial stakeholders. It aims at improving sensory and consumer research methodology for the benefit of the industry and promoting the direct application of sensory analysis methods in the industry, bridging theoretical and applied sciences.

ESN counts 26 member organisations from 16 EU-member states, Norway, Iceland, the UK and other 3 non-European countries (Canada, Israel, USA, and Australia). Member organisations are either research centres or universities that can provide the know-how and the facilities to conduct research on sensory analysis.

On the other hand, there are currently 17 industrial partners with ESN. They are large corporations, multinational groups, food manufacturers, and other industries, including packaging, cosmetics, or cleaning products.

The industry partners are the following:

- AB-InBev
- Arla Foods
- International Flavors & Fragrances Inc.
- Danone
- Firmenich
- FrieslandCampina
- Givaudan
- Heineken
- McCormick EMEA
- Mondelēz International
- Nestlé
- Perfetti van Melle

- Philip Morris International
- Procter & Gamble
- Reckitt
- Symrise
- Tine

Services provided to the industry

The core work of ESN is based on long-term international cooperation between leading research organisations and their industrial partners.

ESN provides three types of services to industry stakeholders:

1. ESN – Industry Network Partnerships

It is an open collaboration between ESN experts and several industrial partners joining their research efforts. The ultimate purpose of this collaboration is to research and develop innovative methods and approaches in sensory and consumer sciences.

The common research and study activities are generally carried out at a pre-competitive level. An industry network partnership is established for at least three years between ESN members and interested companies.

These Partnerships encourage the growth of sensory and consumer sciences in an industrial context through continuous discussions and debate. In fact, formal meetings within the industry partnership framework are organised at least twice a year to discuss and debate the proceedings. The research results are shared first only among members of the partnership. They will be openly published and accessible to the general public only at least 12 months after the end of the project.

2. Collaborative group research

Two or more ESN members and two or more industry partners can set up collaborative group research. The group research represents closer research cooperation, focusing on a particular topic or different technology levels.

Due to the sensitivity of the topic and the possible implications on patents, research results are shared only between group partners and restricted from others. By doing so, industry partners can exploit the findings acquiring an advantage over their competitors.

3. External advisory service

ESN provides industries with the expertise of external advisors in a number of fields: consumers' perception and behaviour, sensory science and market, and data analysis from sensory and consumer studies. ESN advisors have experience both in industry and academia, and their services are tailored to companies' specific requests.

In addition to these services, the conclusions of applied research projects allow ESN to elaborate guidelines for its members. Guidelines can address either testing methodologies or marketing campaigns.

Emerging Networks and International Collaborations

As this research has demonstrated, two main organisations represent the core of Sensory Science in Europe: ESN reunites experts in close collaboration with industrial stakeholders, and E3S reunites mainly personalities from the academia for fundamental and applied studies.

Although the two organisations have different scopes, pooling of knowledge and some overlapping, a number of Universities and research centres provide their services and expertise to both ESN and E3S. Some scientists collaborate actively with both organisations, either as official delegates, referent persons, or consultants. Among them, the following personalities are relevant:

- **Dr. DÜRRSCHMID Klaus (Austria):** He is one of the two official delegates to E3S for the Austrian Sensory Network (Sensorik Netzwerk Österreich and the BOKU University of Natural Resources and Applied Life Sciences (Dept. of Food Science and Technology).
- **Dr. HERSLETH Margrethe (Norway):** She is the official referent for Nofima AS as a member of ESN. She is also a member of the E3S Children Working Group.
- **Dr. SINESIO Fiorella (Italy):** She is the official referent for INRAN (National Institute on Food and Nutrition Research) as a member of ESN. She is also part of the E3S PDO Working Group.
- **Dr. WENDER Bredie (Denmark):** Official referent for the University of Copenhagen (Dept. of Food Science) as a member of ESN. She is part of the E3S Working Group on Taste Sensitivity
- **Dr. SANCHEZ CLIMENT Maria José (Spain):** She is the official referent for AINIA Technology Center as a member of ESN. She is also part of the E3S PDO Working Group.
- **Dr. SULMONT ROSSÉ Claire (France):** She is the official referent for INRA (National Research Institute for Agriculture, Food and the Environment) as a member of ESN. She collaborates with E3S as part of the UK's Institute of Food Science and Technology (IFST), a founding member of E3S.

Together, E3S and ESN reunite most of the academia and industrial stakeholders for Sensory Science; their contribution to the advancement of Sensory Sciences appears to be paving the way for all the others. In fact, outside their umbrella, the Sensory science community is composed of a number of other universities, laboratories, research centres and private corporations providing consultancy services to national/regional networks or other private corporations and SMEs. These other actors, not affiliated with E3S or ESN, represent a comparatively smaller share of the panorama, providing a limited contribution to the scientific discourse on the subject.

Main research Centres

As sensory science represents a useful asset for both the industry sector and national authorities, several public/private-owned research centres are engaged in research projects funded by private and public investors.

This research has identified some of the excellence centres active in sensory-related research that serves different purposes:

- **WUR - WAGENINGEN University & Research (The Netherlands):** WUR and its Food & Biobased Research (WUR-FBR) department represent an excellence centre for applied research and innovation in the agri-food sector. WUR carries out applied research activities through academic partnerships and investments from private clients.

Sensory analysis is used by WUR-FBR for a wide range of purposes, from food quality assessment to the study of nutrition and feeding habits, from the development of food products that are innovative, sustainable, and with an extended shelf life.

WUR-FBR is a partner in a large number of food-related projects wherein sensory analysis and measurement play a key role. Among them, the ALL-INFORMED project aims to innovate the process development of meat and dairy alternatives with an improved sensory experience by using IT and AI. Project EXTREAMS has the objective of developing fibre-rich sugar replacers from plant-based sources which are accepted by consumers.

More info on sensory science-related projects by WUR-FBR at <https://www.wur.nl/en/research-institutes/food-biobased-research/projects.htm>

- CAMPDEN BRI (UK and Hungary):** Campden BRI is a private corporation in food technology. Its main field of activity is technical support services in testing and innovation for food and drink companies worldwide. Sensory analyses are used to conduct market-oriented research on several topics, such as product development, product quality, consumer studies, market insights, authenticity testing, shelf-life improvement, ingredients and raw material evaluation. The extensive programme of research and innovation of Campden BRI is also supported by a series of knowledge management activities. Expertise and know-how are shared throughout training courses, workshops and other events. Since 1919, Campden BRI has also established a partner company in Hungary, which allows it to continue operating in the European Union. Campden BRI Hungary has therefore been able to apply for projects funded and co-founded by the EU, such as the RIS Consumer Engagement Labs under the EIT Food scheme. The project used a series of sensory panels to test and launch on the market 15 new foods. More info on RIS Consumer Engagement Labs on <https://www.eitfood.eu/projects/ris-consumer-engagement-labs>
- ATZI (Spain):** Founded in 1981 and specialised in Marine and Food Research, ATZI is a private non-profit organisation and a Basque Research and Technology Alliance (BRTA) member. Its objective is social development and the improvement of competitiveness. The centre carries out research-oriented projects geared towards knowledge generation and high-added-value technological products. Sensory science research is carried out on the enhancement of food quality control and studies on consumer behaviour. ATZI collaborates with the International Life Sciences Institute (ILSI) Europe and 25 other partners located in 14 countries on **project TITAN**, which is dedicated to food safety and traceability. More info on TITAN on <https://titanproject.eu/partners/azti/>
- INSTITUT PAUL BOCUSE Research Centre (France):** is a non-profit research unit dedicated to the scientific investigation of the various factors underlying and influencing human eating behaviours. The IPBRC conducts research activities in sensory science to investigate the social, economic, cognitive, and physiological aspects of food consumption, with the objectives of promoting healthy and sustainable diets, meeting consumer expectations and identifying future practices in the food sector.
- AGROSCOPE (Switzerland):** Agroscope is the Swiss Confederation's centre of excellence for agricultural research, mainly publicly owned and subordinate to the Federal Department of Economic Affairs, Education and Research. Agroscope, in affiliation with the Swiss Federal Office for Agriculture, aims to contribute to a sustainable agriculture and food sector and maintain an intact environment. In this perspective, Agroscope carries out research activities along the entire

value chain of the agri-food sector “from field to fork. Hence, sensory science is essential in food quality assessment.

Sensory researchers at Agroscope analyse various agricultural products to collect information processes and/or parameters on sensorially perceptible properties and then link them to consumer preferences data.

Agroscope is part of a worldwide partnership network on four pillars: a) Cooperation with platforms and working groups of agriculture and food technology experts; b) third-party funded projects; c) higher education and training; d) Partnerships aimed at strengthening research skills.

- **TEAGASC (Ireland)** - the Agriculture and Food Development Authority of the Irish Republic, is the national body providing integrated research, training and advisory services to the agri-food industry and rural communities. Research activities in the field of sensory science focus on food quality and nutrition with a focus on meat science, cereal/bakery science, and flavour chemistry. Research is conducted at both fundamental and applied levels, with the aim of technology transfer to the agri-food industry. Project activities are designed to sustain food innovation and lead to healthier foods with optimal sensory and flavour characteristics.

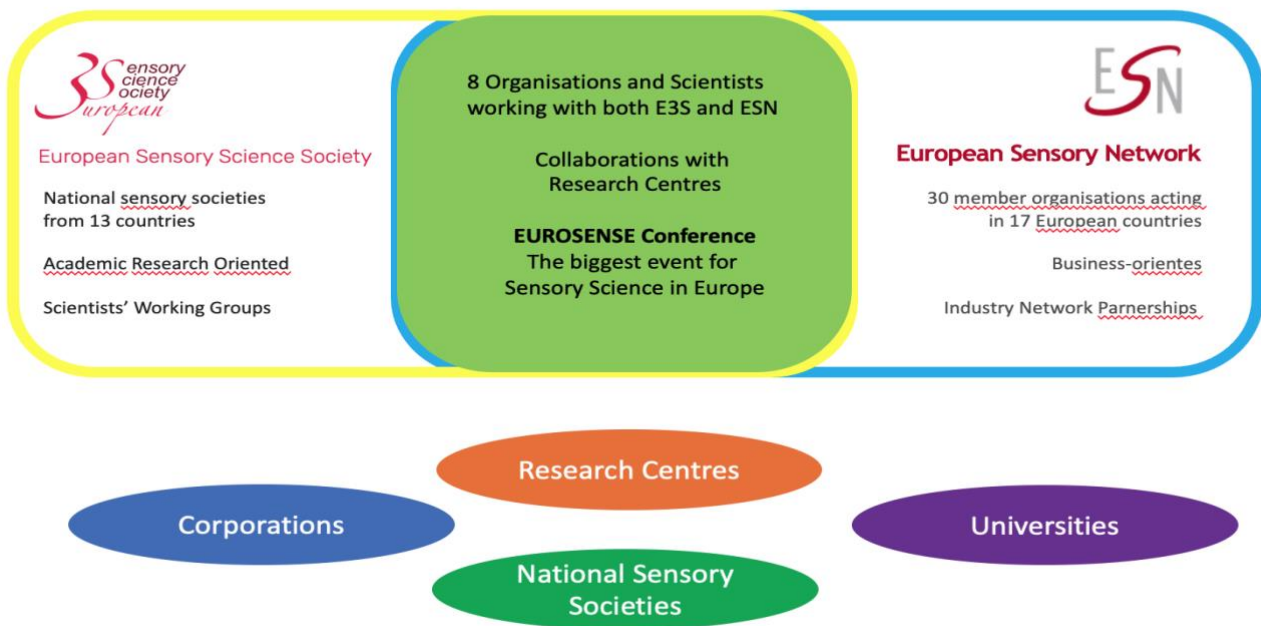
Teagasc is part of the consortium for the **ValuSect project**, funded within the framework of Interreg North-West Europe. Valusect aims to strengthen the development of insect-based food products and facilitate their reception from European consumers.

More info on ValuSect on <https://www.nweurope.eu/projects/project-search/valusect/>

- **NOFIMA (Norway)**: NOFIMA is a leading food research institute carrying out research and development projects for the aquaculture, fishing, and food industries. It is owned by a consortium of public and private entities, the largest share of which is the Norwegian Ministry of Trade, Industry and Fisheries, followed by the Norwegian Foundation for agricultural food research and other private companies. Specialists in sensory science conduct research on food processing with a focus on feeding habits and consumers' behaviour. NOFIMA has participated in project Edulia, funded under the Horizon 2020 programme, on reducing barriers to children's healthy eating. The project intended to find new ways to tackle the escalating issue of obesity by promoting healthier eating from childhood. Some of the other project partners were the University of Florence (Italy), Aarhus University (Denmark), IPBR Centre (France), and Wageningen University, all members of either E3S or ESN. More info on Edulia on <https://edulia.eu>

The mentioned list presents only a limited selection of sensory science research centres in Europe. These institutions function as a trait-d-union to create synergies between public funding and private-sponsored research. Their analysis services can provide knowledge and expertise for both E3S and ESN members.

SENSORY SCIENCE COMMUNITY



Events

There is a number of events in which the sensory science community can debate and discuss the findings of their research, exchange ideas and network with stakeholders and other actors.

The European Conference on Sensory and Consumer Research (EuroSense) is held every two years and is the main event gathering event in Sensory Science.

EuroSense is organised by E3S, with the participation of members from the European Sensory Network (ESN), representing the real opportunity that bridges the two organisations.

The 2022 edition was held in Turku (Finland) from 13 to 16 September and saw the participation of more than 600 delegates. The topic of the 2022 conference was 'A Sense of Earth', with specific attention on the role of sensory perception in relation to themes such as sustainability and biodiversity, health, and cross-cultural factors in consumers' behaviour. The conference also focused on citizen involvement in sensory and consumer science and making the field more inclusive.

Within the EuroSense conferences, E3S confers the EuroSense Students Awards. The awards consist of 4 prizes of €1,500 given to PhD students enrolled at universities in countries member of the E3S. The winners are chosen for their remarkable contributions to EuroSense conferences thanks to their innovative research and findings. Besides the monetary prize, winners are given the opportunity to publicly present their research projects at EuroSense.

The 2022 edition saw as winners the following PhD students:

- Leonardo Menghi, University of Trento (Italy) and University of Southern Denmark (Denmark), for his research on links between microbiota and differences in sensory responsiveness.
- Victoria Norton, University of Reading (United Kingdom), for her research on individual variation in mouthfeel
- Hannah Ford, University of Nottingham (United Kingdom), for her research on meat-eating consumers' willingness and motivations to reduce meat intake

- Ansung Kim, Örebro University (Sweden), for her research on consumers' attachment towards meat and preferences for plant-based alternatives.

The next edition of EuroSense will be held in 2024 on 8-11 September in Dublin, Ireland. It will be the 11th edition of the event. The theme of EuroSense 2024 is 'A Sense of Global Culture'. It intends to explore how sensory science is transforming within the context of a globalised world, with human societies transforming their values and lifestyles. Speakers from Europe and worldwide will present their latest findings and discuss sensory science and consumer research globally.

Besides the bi-annual EuroSense conference, other events dedicated to sensory science are held regularly.

List of the main events in 2023:

- PhD COURSE: Sensory Evaluation and Food Preferences – Copenhagen, 10 -12 May, Copenhagen (Denmark)
- 11th E3S annual Symposium 2023, 15-16 May, Uppsala (Sweden)
- UNDERSTANDING CONSUMERS 2023, 7-9 June, SISS (Online)
- I International Course on Sensometrics – AEPAS course, 11-15 September, Madrid (Spain)
- Course: Fundamentals of Discrimination Testing and Drivers of Liking, 23-25, 2023 May, Lausanne (Switzerland)
- 3rd International Symposium on Altered Taste, 14-15 September 2023, Lyon (France)
- 13th International Conference on Culinary Arts & Science (ICCAS), 17-20 June 2024 Kristianstad (Sweden)
- 15th Pangborn Sensory Science Symposium: Meeting new challenges in a changing world, 20-24 August, Nantes (France)

Publications of interest

- Derek V. Byrne (2022), "Effects and Implications of COVID-19 for the Human Senses, Consumer Preferences, Appetite and Eating Behaviour", Foods open access journal.
- Derek V. Byrne, Barbara Vad Andersen (2022), Recent Advances in Understanding Human Appetite: From Metrics to Influential Factors and Their Effects on Eating Behaviour, Foods open access journal.
- D. V. Byrne Ed. (2021), Food, Health and Safety in Cross-Cultural Consumer Contexts', Foods open access journal.
- Monteleone Erminio, Spinelli Sara, Dinnella Caterina (2021), Covid-19 and sensory science: implications on perception, consumer preferences and tests, Food Quality and Preference, 94.

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Conclusions

The Polish food sensory science community is thriving, thanks to strong connections between academia and industry that promote innovation and knowledge exchange. Researchers in Poland significantly contribute to understanding the complex relationships between food properties, sensory experiences, and consumer preferences. As the demand for high-quality, safe, and sustainable food products grows, Poland's food sensory science community will play an increasingly important role in shaping the future of food production and consumption both domestically and internationally.

Key institutional stakeholders work together to ensure food safety, quality, and sustainability, promoting research, innovation, and collaboration in food sensory science. These efforts support the growth of the Polish food industry and the food sensory science community. Pioneers of food sensory science in Poland have laid a solid foundation for today's thriving community, inspiring current and future researchers, industry professionals, and policymakers.

The Faculty of Biotechnology and Food Science at Wroclaw University of Environmental and Life Sciences is a leading institution in food sensory science in Poland. Through research, education, and collaboration, the faculty contributes to the growth and development of the food sensory science community, both nationally and internationally. The work of Prof. Agnieszka Kita, Dr Malgorzata Korzeniowska, and Dr Anna Michalska-Ciechanowska, Dr Agnieszka Nemś showcases the dedication and expertise present within the institution.

The information and the data gathered in this initial analysis reinforce the conviction that the specialisation in one or more areas of sensory sciences has the potential to give FBFS a unique positioning in the European landscape of research and testing capacities, in particular in the East of Europe, where the offer for industry services is still very limited. The research organisations, people and networks identified in this phase might all prove functional to the beneficiary's objective of reinforcing its capacities and establishing a research centre on consumers' behaviour. However, it should not be overlooked that consumer behaviour is a complex discipline for which many resources and capacities are offered throughout Europe. In this respect, the management of FBFS should pay strong attention to diversifying its offer in a way that reflects both the needs of the country/region in which it operates and the emerging trends in food technology and nutrition.

Mandatory and non-mandatory requirements connected to several sustainability aspects are globally emerging in food value chains. Whereas taste and sensory experience remain among the key drivers in choosing a product, the narrative related to how sustainable that product (and the experience it provides to the consumer) should not be underestimated. Ethical and sustainability requirements are growingly being imposed on suppliers and are more and more visible or perceivable by the final consumer, within trends such as the reduction of meat consumption or better choices oriented to products that have a lighter environmental footprint. Even if the change in food consumption trends is not immediately visible, this does not mean that the process is not in place. It is not by chance that news related to insect production plants in Poland was published on the website of the Dutch Ministry for Agriculture, Nature and Food Quality² under the title "Will Poland start eating insects".

We believe that three factors will be fundamental in defining FBFS' role in the new European arena of food science.

² <https://www.agroberichtenbuitenland.nl/actueel/nieuws/2023/03/01/will-poland-start-eating-insects#:~:text=and%20pet%20food,-,In%20December%202022%20the%20company%20announced%20the%20construction%20of%20a,15%25%20of%20the%20feed%20volume.>

- a) **Diversification** – A deep reflection must be launched within FBFS to differentiate its offer in the consumer's behaviour centre to be promoted in light of what is already being offered by many other well-established stakeholders and research organisations in Europe.
- b) **Understanding the trends** – For its offer to be unique (diversification), FBFS must develop internal capacities to detect, analyse and understand global trends within a complex system's logic rather than confine itself to a hyper-specialised niche. Food is a global market and a huge one. No coherent offer can be developed without putting food into the wider context of the huge efforts that the international community and the EU are putting into making food systems more sustainable.
- c) **Credibility** – FBFS' potential to attract partners, investors, and clients for its services, as well as new qualified resources, will depend on the quality of its engagement process with many of the stakeholders that have been identified in this phase. Networking is, needless to say, important. But networking efforts must be supported by coherent messages (connected to the above points a) and b)) through very coherent messages and a clearer definition of the objectives to be achieved through the establishment of the centre so that the credibility of FBFS will be enhanced in the international scientific community.