SUSFOOD2

RESEARCH AND INNOVATION TOWARDS MORE SUSTAINABLE FOOD PRODUCTION AND CONSUMPTION

RESEARCH YIELDS SOLUTIONS ON SUSTAINABLE FOOD PRODUCTION AND CONSUMPTION, BUT FOOD SYSTEM TRANSITION NEEDS INCENTIVES AND POLICY SUPPORT.

This policy brief indicates how research results can support the scientific evidence to enable a transition towards more sustainable food systems. The brief is based on the results of 12 research projects funded under the SUSFOOD2 co-funded call 2017, spanning three thematic areas: resource efficiency and valorization, processing technologies, and consumer behaviour.

MAIN FINDINGS:

1. Food loss and waste can be reduced and re-used for value added products.
2. New technologies are evolving but the risks for early adopters needs to be mitigated.
3. Incentives are needed to promote sustainable food practices throughout the food systems.
4. Affordability, consciousness, and responsibility of food system actors are key factors for enabling sustainable food choices.

KEY POLICY RECOMMENDATIONS:

1. Provide clear messages to consumers to increase the trust in food
2. Harmonize the nutritional and sustainability regulations and labels
3. Support the uptake of new technologies and side stream valorization
4. Create a forum to collect the evidence and discuss regulatory aspects for new technologies

1 JAN 2017 - 30 JUNE 2022
ERA-NET COFUND ON SUSTAINABLE FOOD PRODUCTION AND CONSUMPTION
THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION'S HORIZON 2020 RESEARCH AND INNOVATION PROGRAM ME UNDER GRANT AGREEMENT N° 727473

JUELICH (GERMANY)
COORDINATOR

CONTEXT

Improving the sustainability of food production and consumption is essential for European policies to tackle food and nutrition security, climate change and other global challenges. As such, the EU **Green Deal** aims at advancing the Paris Climate Agreement and the United Nation's 2030 Agenda for Sustainable Development. The **Farm to Fork (F2F)** and **Biodiversity** strategies are at the heart of the Green Deal and support the Food2030 ambitions on "climate & sustainability", "nutrition & health", "circularity & resource efficiency" and "innovation & communities".

Global demand for food is expected to rise by at least 60% by 2050. At the same time the food supply chain is under pressure due to limited resources, soil degradation, biodiversity loss and the impacts of climate change. More than one third of the food produced in the world today is lost or wasted. Our food systems has experienced huge transformation during the last century with changes in food consumption patterns impacting health and food availability. To meet these challenges, **we need transition to more sustainable food systems** providing opportunities for all stakeholders to develop a secure, resilient, and competitive sector.

The ERA-NET Cofund SUSFOOD2 - "SUStainable FOOD production and consumption" (2017-2022) consists of a network of 26 partners from 15 countries. The strategic goal of SUSFOOD2 complements the EU bioeconomy and food policies, and aims to reinforce cooperation in food research, development, and innovation to maximize their contribution to the development of more sustainable food systems from production to consumption.

SUSFOOD2 promotes a cross-sectoral and multi-disciplinary approach from biology to food engineering and social sciences. It addresses the following socio-economic and environmental goals:

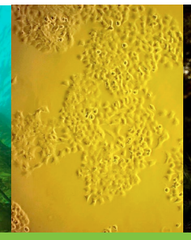
- To develop sustainable food systems from production to consumption, to increase food production sustainably while reducing waste in food supply chain and limiting environmental impacts.
- To improve the quality of life by improving food quality in a sustainable way and to ensure the resilience of the food supply chain.
- To encourage sustainable consumer behaviours and food choices.
- To improve competitiveness and economic growth in the European food industry with special attention to SMEs.

KEY RESULTS FROM SUSFOOD2 CO-FUNDED PROJECTS

SUSTAINABLE CONSUMPTION IS AN INDIVIDUAL CHOICE BUT ALSO A SOCIETAL ISSUE

- **Information to consumers must be clear, transparent, and measurable,** analysis of food and drink choices regarding sustainability among European young adults reveals importance of information. Need for information was shown also in restaurants and canteens to prevent food waste and use new sources of essential ingredients (SUSCHOICE, AVARE[1] , SUSPUFA).





- **Social dimensions are important,** e.g. young adults show concern and ask for responsibility and an integral approach to food sustainability of policy makers. Food producers and restaurants/canteens can contribute by donating left-over food instead of wasting (SUSCHOICE, AVARE[2]).
- **Education, common practices and incentives set the basis for our behaviour,** e.g. study with young adults and the barriers of online food platforms highlight routines and practices that are not digitalization-friendly (SUSCHOICE, PLATEFORMS).
- **There is enormous potential in agro-food by-products and side streams:** Fibers and proteins can be enriched from brewer"s spent grain (FUNBREW) or side stream press cakes (DISCOVERY), and fibers from fruit pomace (IMPROVE). The side streams from fruit industry (orange, apple, winery etc) are a good source of polyphenols, aromas, essential oils, or elicitors which can substitute agrochemicals (SPAREC, IMPROVE).
- **Reprocessed side streams can be integrated into new food products for human consumption giving added value regarding sustainability, functionality, and health attributes.**

  Examples include:
  - Fibers and proteins from brewer"s spent grain add value to pasta, bread and cereals (FUNBREW)
  - Fibers and proteins from soy processing press cakes add value to meat analogues and bread (DISCOVERY[3])
  - The side streams from vegetable and potato industry can be transformed to meat analogues, purees, extruded snacks,or powders to be used as functional ingredients/intermediates (emulsifiers, starch substitutes) (INPROVE)
  - **By-products from the food industry or food waste from restaurants and canteens can be used as substrates for microalgae,** which in turn are capable in producing essential fatty acids like n3-PUFAs (e.g. DHA) and can therefore represent an important and more sustainable source for human consumption instead of fish (SUSPUFA, AVARE[4]).

New environmentally friendly processing and extraction techniques are available. They are often more resource efficient, reduce the use of energy, time, or water, or increase yield. Often, processes are simpler with better control and potential of variable applications. Examples of green techniques include:

- Pulsed electric fields, supercritical fluid extraction for vegetable and potato side stream valorization. Innovative canning and use of microwave to save time, energy and water (INPROVE).
- Ultrasound, microwave, enzymes for extraction of carbohydrates and bioactive compounds from seagrasses and seaweeds as well as biodegradable packaging materials from process residues (BIOCARB4FOOD).
- Natural Deep Eutectic Solvents for extraction of polyphenols from fruit pomace (IMPROVE).
- Fermentation of brewer"s spent grain to enable the use of valuable ingredients for novel food products (FUNBREW).
- Higher yield by disaggregation of vegetable press cakes using ultrasound and ultrafiltration (DISCOVERY).
- Low energy direct heating by moderate electric fields (MEFPROC).
- Coupling of acid fermentation and monocultivation of algae provide n3-PUFAs (AVARE).

The received products, ingredients and compounds are safe and healthy, showing high nutritional and sensorial quality and functionality (INPROVE, MEFPROC, PROSEAFOOD[5], FUNBREW). Also new raw materials like seaweeds can be unlocked for human consumption using green processing technologies (BIOCARB4FOOD, PROSEAFOOD).

POLICY RECOMMENDATIONS

Scientific evidence from the SUSFOOD2 funded projects clearly support the Farm to Fork approach and Food2030 goals to value food sustainability. SUSFOOD2 thus suggests following actions:

1 PROVIDE CLEAR MESSAGES TO CONSUMERS TO INCREASE THE TRUST IN FOOD

Food systems are complex and there are conflicting notions of sustainability. We recommend that policy makers and industry apply an integral approach to food sustainability, and that policy makers, producers and retailers increase the transparency of food supply-chain efforts. There is no sustainable food choice without affordability, consumer consciousness and business responsibility. Distinctive, practical, and modern communication is required for transparency towards consumers about all aspects of sustainability.

2 HARMONIZE THE NUTRITIONAL AND SUSTAINABILITY REGULATIONS AND LABELS

Nutritional and sustainability recommendations need integration and harmonization. Labels on food products should be standardized at European level and in line with the EU strategies. This implies harmonization between different countries and aiming at consistency. SUSFOOD2 supports the EU initiative on substantiating green claims but also integrating nutritional claims. In addition, it is important to integrate the nutritional and sustainability dimensions in dietary recommendations.

3 SUPPORT THE UPTAKE OF NEW TECHNOLOGIES AND SIDE STREAM VALORIZATION

Policy must set the basis to facilitate reduction and reutilization of food waste. Food side streams, as any other biological resource, should be transformed step-by-step and wholly into new food, feed, bio-based chemicals and materials, including food packaging, and into more resources for the benefit of society and the environment. Food industry, from SMEs to big companies, need incentives for the uptake of new sustainable technologies and products.

4 CREATE A FORUM TO COLLECT THE EVIDENCE AND DISCUSS REGULATORY ASPECTS FOR NEW TECHNOLOGIES

We suggest creating a forum that would collect the evidence needed for a faster approvement of novel foods and new technologies, which can support the necessary steps in the transition towards increased food system sustainability. The forum would also facilitate dialogue between food systems actors on the research needed to be carried out to get the evidence for food safety and other regulatory aspects.

LINKS

SUSFOOD2
AVARE
BIOCARB4FOOD
DISCOVERY
FUNBREW
IMPROVE
INPROVE
MEFPROC
PLATEFORMS
PROSEAFOOD
SPAREC
SUSCHOICE
SUSPUFA

CONTACT

ptj-susfood@fz-juelich.de
https://susfood-db-era.net
@susfood_eranet

[1] Malefors, C., Sundin, N., Tromp, M., Eriksson, M., 2022, Testing interventions to reduce food waste in school catering, Recourses, Conservation and Recycling, 117, 105997.
Matzembacher, D., Brancoli, P., Maia, L., Eriksson, M., 2020, Consumer's food waste in different restaurants configuration: a comparison between different levels of incentive and interaction, Waste Management, 114, 263-273.
[2] Bergström, P., Malefors, C., Strid, I., Hansen, O.J., Eriksson, M., 2020, Sustainability assessment of redistribution alternatives for surplus food in Sweden, Recourses, 9, 27.
[3] Juodeikiene, G., Trakselyte-Rupsiene, K., Navickaite, B., Zadeike, D., Bendoraitiene, J., Bartkiene, E., Lele, V., Rueller, L., Robert, J., Arnoldi, A., Aiello, G., Glasner, C., 2021, Functionalization of soya press cake (okara) by ultrasonication for enhancement of submerged fermentation with Lactobacillus paracasei LUHS244 for wheat bread production.
[4] Bartek, L., Strid, I., Henrysson, K., Junne, S., Rasi, S., Eriksson, M., 2021, Life cycle assessment of fish oil substitute produced by microalgae using food waste, Sustainable, Production and Consumption, 27, 2002-2021.
[5] Rasi, S., Vainio, M., Blasco, L., Kahala, M., Leskinen, H. & Tampio. E 2022, Changes in volatile fatty acid production and microbiome during fermentation of food waste from hospitality sector, Journal of Environmental Management 308,114640.
[6] Aiello, G., Pugliese, R., Rueller, L., Bollati, C., Bartolomei, M., Li, Y., Robert, J., Arnoldi, A., Lammi, C., 2021, Assessment of the Physicochemical and Conformational Changes of Ultrasound-Driven Proteins Extracted from Soybean Okara Byproduct, Foods, 10, 562.