



NUTRITIOUS, SAFE AND SUSTAINABLE SEAFOOD
FOR CONSUMERS OF TOMORROW



KEY ACHIEVEMENTS BOOKLET

NUTRITIOUS, SAFE AND SUSTAINABLE
SEAFOOD FOR THE FUTURE

APRIL 2021

INTRODUCTION

By 2050, population and economic growth is expected to result in a doubling of global demand for food. One of the main associated challenges will be ensuring that food production and consumption are socially, economically and environmentally sustainable.

Seafood is one of the most important food commodities consumed in Europe as it is an important source of high-quality protein and is naturally rich in valuable nutrients for a healthy diet. Therefore, it is vital to develop new, eco-innovative

and transparent seafood production and processing methods that will support European seafood security and quality in line with market demands.

Recognising this major challenge, in 2017 the European Commission launched its "Blue Growth" initiative under the Horizon 2020 programme, calling for ideas and plans from research consortia to develop innovative sustainable solutions to improve the safety and dietary properties of seafood. The **SEAFOODTOMORROW** project was created to respond to these needs.

KEY PROJECT INFORMATION

Funding Programme	Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy (Horizon 2020 BG-08-2017)
Topic	Innovative sustainable solutions for improving the safety and dietary properties of seafood
Type of action	Innovation Action
Duration	November 2017 – April 2021
Consortium	35 partners and 13 third-party affiliate organisations from 19 countries
Coordinator	Instituto Português do Mar e da Atmosfera IP (IPMA), Portugal

PROJECT OBJECTIVES

The overarching objective of **SEAFOOD**^{TOMORROW} was to strengthen the seafood production and processing industry in Europe. Key features included providing validated, market-driven and consumer-responsive eco-innovative sustainable solutions that contribute to food security and safety, mitigate production hazards, contribute to employment and increase consumer awareness of seafood quality and safety. The goal was to support adaptive European management and governance policy systems related to the implementation of the project's solutions in Blue Growth sectors. Specifically, **SEAFOOD**^{TOMORROW} aimed to:

- Develop market-driven, tailor-made, eco-innovative seafood products of improved quality, traceability, authenticity and safety.
- Produce innovative, economically-viable seafood production and processing technologies that mitigate hazards and environmental damage.
- Validate new strategies to prevent or remove contaminants from seafood and reduce risks to public health.
- Develop new tools and methodologies to facilitate traceability, authentication, labelling and benchmarking of EU seafood products.
- Improve understanding of market acceptance of eco-innovative seafood solutions in different European regions and amongst different demographics.
- Promote seafood consumption through transparent and responsible communication, dissemination, knowledge transfer and exploitation of project outcomes to stakeholders.

This interactive booklet summarises the key achievements of the **SEAFOOD**^{TOMORROW} project: Nutritious, safe and sustainable seafood for consumers of tomorrow. This booklet is for all seafood stakeholders, including industry representatives, policy- and decision-makers and seafood consumers. We present the Eco-Innovative Solutions and Key Exploitable Results generated by the **SEAFOOD**^{TOMORROW} team, including their potential or realised impact, a summary of dissemination and exploitation activities carried out to date, and the next steps needed to ensure maximum uptake and legacy of the **SEAFOOD**^{TOMORROW} outcomes.

ECO-INNOVATIVE SOLUTIONS AND KEY EXPLOITABLE RESULTS

Eco-Innovative Solutions and Key Exploitable Results (KER) generated by the consortium, under the framework of the **SEAFOOD**^{TOMORROW} project have been categorised under four main themes:

Seafood sustainability

Seafood safety

Seafood quality and transparency

Healthy products and informative tools

SEAFOOD SUSTAINABILITY

Increasing seafood consumption and declining fish stocks have resulted in an increased demand for sustainable food production that is socially, economically and environmentally friendly.

SEAFOOD TOMORROW partners have formulated novel feeds for aquaculture, replacing traditional fish feeds sources of omega-3 fatty acids, such as fishmeal and fish oil, with sustainable eco-friendly natural ingredients. They have optimised protocols to support improved seafood production using Integrated Multi-Trophic Aquaculture systems and demonstrated technologies that can be used to reduce energy and water consumption during seafood processing. **SEAFOOD** TOMORROW research has also advanced models for eco-friendly management strategies against contamination risks at production sites.

These outputs contribute towards ensuring **sustainable production and processing of seafood**, improving consumer perception of the industry, and securing growth in the seafood sector.

Novel aquafeed for biofortified common carp

Novel aquafeeds for biofortified rainbow trout

Novel aquafeed for biofortified gilthead seabream

Reducing energy and water usage and costs in seafood processing

Optimization of Integrated Multi-Trophic Aquaculture (IMTA) with seaweed and salmon

Buffer Zones for sustainable management of shellfish production areas

SEAFOOD SAFETY

Seafood safety is of paramount importance for ensuring both the availability of safer seafood on the market, and industrial growth and competitiveness.

SEAFOOD TOMORROW partners have tested and validated methods to remove or reduce contaminants in seafood produce and ready-to-eat products. They have also demonstrated and validated new technologies to detect contaminants in seafood that can be used by producers to control the risk of contaminants and reduce loss of their products.

These outputs contribute towards **ensuring safe seafood for all**, improving consumer trust and increasing profitability of the seafood sector.

Paralytic Shellfish Poisoning detoxification process for mussels, clams and scallops

Improved norovirus removal from Pacific oysters during depuration

Enzymatic biosensor for fast screening of Xenobiotics in seafood

Bacteriophage biocontrol against pathogenic bacteria in seafood

A fast screening method for the detection of Tetrodotoxin (TTX) in seafood

Optical biochip for single- and multi-plex detection of regulated marine toxins in seafood

SEAFOOD QUALITY AND TRANSPARENCY

The seafood industry is a global and diverse sector, making it vulnerable to fraud and challenging to ensure good practice, quality, and safety standards are met at all levels along the supply chain.

SEAFOOD^{TOMORROW} partners have developed a concept for an accredited certification scheme, based on a benchmark tool and utilising a quality label. Linked to a new seafood traceability tool, these outputs allow for easy and comprehensive access to product information for users all along the value chain. **SEAFOOD^{TOMORROW}** partners have also demonstrated a fast, low-cost and easy-to-use DNA technique and established a new DNA database that supports the reliable identification of seafood species, even in highly processed products.

These outputs contribute towards improving transparency in seafood authentication, **ensuring that seafood quality** and production and processing best practices are met.

Seafood quality and safety: benchmark tool and label

Digital traceability system for the seafood trade chain

Seafood authentication: DNA reference database

Seafood authentication: DNA-based tool for fast salmon authentication

HEALTHY PRODUCTS AND INFORMATIVE TOOLS

Seafood is a good source of high-quality protein, vitamins, minerals and fatty acids, making it a nutritious food for all consumers, especially pregnant women, children and older adults as it meets their specific dietary needs. However, the majority of consumers, including these population groups, do not eat the recommended weekly seafood intake.

SEAFOOD^{TOMORROW} partners have created delicious recipes for new, ready-to-eat seafood dishes that meet consumer dietary needs. The recipes include adaptations to reduce the amount of sodium in processed seafood products. A selection of recipes for at home cooking have been published in a free e-recipe book. The team has also launched a new version of FishChoice – a free, web-based tool and smartphone app that provide detailed information on the benefits (nutrients) and risks (potential pollutants), as well as sustainability of seafood, to guide consumers in their daily choices.

A new web-based training course, addressing education gaps in the seafood sector, has been developed for managers in this sector.

These outputs contribute towards **improving access to reliable information** to support seafood consumers in making **informed decisions** and **eating healthy seafood**, thereby improving consumer health in Europe. The outputs also contribute to influencing behaviours of seafood stakeholders, emphasising the importance of seafood as a healthy food product and contributing to socio-economic growth of the sector.

Tailor-made seafood-based meals and recipes for target consumer groups

Reduced-sodium seafood products: smoked salmon

Reduced-sodium seafood products: salmon pâté

E-learning: free online training platform for the seafood industry

FishChoice: A benefit / risk communication tool for sustainable seafood consumption

ADDITIONAL RESOURCES AND RESEARCH OUTPUTS

Scientific publications

Eco-innovative sustainable solutions for the seafood industry: Findings & challenges | Special issue in Food and Chemical Toxicology

Seafood eco-innovations | Special issue in Food and Chemical Toxicology

Public deliverables

Data Outputs: Traceability, Quality, Certification Database

Data and Research Outputs: Zenodo Community

Horizon Results Platform Results

Multimedia

Project videos

Consumer Factsheet Series

- All Consumers
- Pregnant Women
- Children
- Older Adults

CONCLUSION

Launched in 2017, **SEAFOOD^{TOMORROW}** set out to strengthen the seafood production and processing industry in Europe. Over the project's three and a half years, **SEAFOOD^{TOMORROW}** has generated new knowledge, created new tools and solutions to tackle some of the biggest issues facing the seafood industry: sustainability, ensuring safety, quality and transparency and availability of products that meet consumer needs.

Working together, the **SEAFOOD^{TOMORROW}** consortium, comprised of research institutes, SMEs and seafood interest association groups, has developed market-driven and consumer-responsive eco-innovative sustainable solutions for all seafood stakeholders, from producers to processors, management and regulatory bodies, retailers, researchers and consumers.

To ensure that all the results are used by the key stakeholders in the seafood sector, **SEAFOOD^{TOMORROW}** has carried out customised transfer activities for each target audience. Three demonstration workshops were held to bring these outputs directly to industry. A policy meeting was held to support transfer of recommendations made by the consortium, and to support uptake of solutions by industry that first require legislative change. The project's final event was a celebration of these achievements, as well

as an opportunity to further reach stakeholders. It is hoped that this effort will translate into new collaboration agreements and further funding to continue developing some of the outputs presented within this document.

The **SEAFOOD^{TOMORROW}** team is confident that market implementation of their solutions and outputs will lead to an increase in sustainability and competitiveness of the European seafood industry, and ensure more nutritious, safe and sustainable seafood for all consumers in the future.

"Despite the challenging times we find ourselves living in due to the Covid-19 pandemic, we can be very proud of our project's achievements! Our solutions will contribute to the EU green deal strategy, circular economy and zero waste in the seafood sector. They will support the seafood industry in navigating future societal challenges and emerging risk due to climate change and in offering trustful, safe and nutritious food to society. We look forward to seeing our products and innovations progress even further and contributing to an improved seafood sector and sustainable society that we all believe in"

António Marques, **SEAFOOD^{TOMORROW}** Project Coordinator, April 2021.

PROJECT PARTNERS



AQUATT
Science. Communication. Knowledge. Innovation.

MRAG

IPMA
Instituto Português do Mar e da Atmosfera

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food and drink innovation

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GHENT UNIVERSITY

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Rijksinstituut voor Volksgezondheid en Milieu
Ministerie van Volksgezondheid, Welzijn en Sport

ILVO
Flanders Research Institute for Agriculture, Fisheries and Food

EuroFIR
European Food Information Resource

MØREFORSKING



PTC Phage Technology Center GmbH

SPES GEIE
Spread European Safety
Gruppo Europeo di Interesse Economico

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