



Deliverable title	D1.3 General Project meeting n.2 Report
Deliverable Lead:	UNIVPM
Related Work Package:	WP1 - Project coordination and overall management
Related Task:	T1.1 Organization of general Project meetings
Author(s)	Lucia Aquilanti
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Summary of Deliverable D1.3 – General Meeting n.2 Report	The second general meeting of SEAFENNEL4MED, held online on May 11th, 2023, was a milestone moment for the consortium as it moved from early organization to tangible results. More than just a formal update, the meeting served as a dynamic forum where researchers, agronomists, technologists, and economists from eight partner institutions shared progress, challenges, and inspiring new ideas. Each Work Package leader reported on achievements to date. Communication and dissemination activities have flourished, with a project website, intranet, newsletters, and press releases already reaching wide audiences. A stakeholder platform, now counting over 100 members, was strengthened through an innovative multilingual survey that collected suggestions for sea fennel-based foods, ranging from traditional recipes to creative new products like beer, pesto, or snacks. On the scientific side, wild sea fennel populations were sampled across the Mediterranean, with seeds stored in national seed banks and genetic analyses underway to identify promising ecotypes. Cultivation trials have begun, supported by soil studies and bio-fertilizer applications, though germination challenges required some adjustments. Meanwhile, several prototypes of innovative foods - both fermented and unfermented - are already being tested, from kimchi-like preserves to noodles enriched with sea fennel. By-products are also being valorized, with extracts and essential oils under study for potential use in foods, nutraceuticals, and even animal feed. The socio-economic and environmental dimensions are also advancing. A Delphi survey has been launched to explore consumer attitudes and market drivers, while preparations are underway for Life Cycle Assessments of cultivation systems and food products.

	Beyond technical progress, the meeting highlighted the importance of teamwork and coordination. Partners reaffirmed the value of regular WP meetings, better use of shared platforms, and stronger collaboration across disciplines.
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Versioning and Contribution History

Version	Date	Modified by	Modification reason
v1.0	19/05/2023	Lucia Aquilanti	First version
v2.0	30/05/2023	Lucia Aquilanti	Comments after peer review process

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1 General Project meeting n.2

PRIMA FUNDED PROJECT UNDER THE 2018 CALL

“Innovative sustainable organic sea fennel (*Crithmum maritimum* L.) -based cropping systems to boost agrobiodiversity, profitability, circularity, and resilience to climate changes in Mediterranean small farms”

Acronym SEAFENNEL4MED

11st MAY 2023

1.1 LOCATION

TEAMS platform



P1- Università Politecnica delle Marche
short name: UNIVPM

	NAME AND SURNAME	EMAIL ADDRESS	ROLE	WP	PRESENCE
1	LUCIA AQUILANTI	l.aquilanti@univpm.it	Coordinator – WP1 Leader Food microbiologist	All	P
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5	ESTER FOPPA-PEDRETTI	e.foppa@univpm.it	Team member - Agricultural Engineer	1, 2, 8	A
6	SIMONA CASAVECCHIA	s.casavecchia@univpm.it	Team member - Botanist	1, 2, 3	P
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8	ROBERTO ORSINI	r.orsini@univpm.it	Team member - Agronomist	1, 2, 4	A
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16	MASSIMO MOZZON	m.mozzon@univpm.it	Team member – food technologist	1, 2, 5	A
17	FILIPPO GAUDENZI	f.galdenzi@staff.univpm.it	Team member – Research fellow	1, 2, 5	A

P2- Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria
short name: CREA-AN

	NAME AND SURNAME	EMAIL ADDRESS	ROLE	WP	PRESENCE
1	Antonio Raffo	antonio.raffo@crea.gov.it	Principal Investigator– Food chemist	1, 2, 3, 4, 5, 6	A
2	Fiorella Sinesio	fiorella.sinesio@crea.gov.it	Team member – Senior researcher in sensory and consumer science	4,5,6	A
3	Elisabetta Moneta	elisabetta.moneta@crea.gov.it	Team member - Technical Collaborator for Research	4,5,6	A
4	Marina Peparaio	marina.peparaio@crea.gov.it	Team member - Technical Collaborator for Research	4,5,6	A
5	Eleonora Saggia Civitelli	eleonora.saggiacivitelli@crea.gov.it	Team member - Technical Collaborator for Research	4,5,6	A

6	Irene Baiamonte	irene.baiamonte@crea.gov.it	Team member - Researcher	3,4,5,6	P
7	Nicoletta Nardo	nicoletta.nardo@crea.gov.it	Team member - Technical Collaborator for Research	3,4,5	A
8	Valentina Melini	valentina.melini@crea.gov.it	WP5 Leader - Researcher	1,2,3,4,5,6	P

P3- RINCI

short name: RINCI

	NAME AND SURNAME	EMAIL ADDRESS	ROLE	WP	PRESENCE
1	LUCA GALEAZZI	l.galeazzi@rinci.it	Principal Investigator – Food technologist	1, 2, 4, 5, 6, 7, 8	A
2	CLAUDIA GONNELLI	c.gonnelli@rinci.it	Team member – expert in sales and marketing	1, 2	A
3	ETTORE DRENAGGI	etdrenaggi@gmail.com	External consultant – Agronomist	3	A

P4- University of SPLIT

short name: UNIST

	NAME AND SURNAME	EMAIL ADDRESS	ROLE	WP	PRESENCE
1	IVANA GENERALIĆ MEKINIĆ	gene@ktf-split.hr	Principal Investigator - Food Technologist	1, 2, 3, 5, 6	P
2	OLIVERA POLITEO	olivera@ktf-split.hr	Team member – Biochemist	3, 6	P
3	VIDA ŠIMAT	vida@unist.hr	Team member – Food Technologist	3, 5, 6	A
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6	LINDA BAZINA	linda.bazina@pmfst.hr	Team member – PhD Student	3, 5	A
7	SANJA RADMAN	sanja.radman@ktf-split.hr	Team member - Biotechnologist	1, 2, 5, 6	P

P5- INSTITUTE FOR ADRIATIC CROPS AND KARST RECLAMATION

short name: **IACKR**

	NAME AND SURNAME	EMAIL ADDRESS	ROLE	WP	PRESENCE
1	Branimir Urlic	branimir.urlic@krs.hr	Principal Investigator - WP4 Leader Agronomist	1, 2, 3, 4, 6, 7	P
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6	Marko Runjic	marko.runjic@krs.hr	Team member – Post Doc Researcher	3, 4, 7	P

P6- UNIVERSITÉ DE BRETAGNE OCCIDENTALE

short name: **UNIBRE**

	NAME AND SURNAME	EMAIL ADDRESS	ROLE	WP	PRESENCE
1	Christian Magné	christian.magne@univ-brest.fr	Principal Investigator – WP6 Leader Plant Physiologist and Biochemist	1, 2, 3, 4, 6, 7	P
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3	Killian Auzende	killian.auzende@univ-brest.fr	Team member – Design Engineer	3, 6	A
4	Monique Arzur	monique.arzur@univ-brest.fr	Team member - Technician	3, 6	A
5	Manon Inizan	manon.inizan@univ-brest.fr	Team member - Technician	3, 6	A

P7- INSTITUT NATIONAL DE RECHERCHE EN GÉNIE RURAL, EAUX ET FORÊTS

short name: **INRGREF**

	NAME AND SURNAME	EMAIL ADDRESS	ROLE	WP	PRESENCE
1	Abdelhamid Khaldi	khalditn@yahoo.fr	Principal Investigator - Senior Researcher in Forestry	1, 2, 3, 4, 5, 6, 7	A
2	Faten Mezni	faten-mez@hotmail.com	Team member - Post Doc researcher - Valorization of forest resources	1, 2, 3, 4, 5, 6, 7	P
3	Ammar Hadj	ammar_hadj@yahoo.fr	Team member - Technician	2,3,4,5,6,7,8	A
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5	Kaouther Ben Yahia	adam.kaouther@yahoo.fr	Team member - Associate professor in Forest Ecology	2,3,6,7,8	P

6	Lilia Naui	lilyabouden@gmail.com	Team member – Agri-food engineer	1, 2, 3, 4, 5, 6, 7	P
7	Boutheina Stiti	stitibou@gmail.com	Team member – Researcher in Forest Ecology	2,4,5,6,8	P
8	Mohamed Tahar El Ayeb	med.elaieb@gmail.com	Team member – Associate professor in Forest Ecology	2,6,8	A
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10	Ezzedine Saadaoui	saad_ezz@yahoo.fr	Team member – Associate professor in Forest resources	2,3,4,6,7,8	A
11	Ali El Khorchani	ali_el_khorchani@yahoo.fr	Team member – Assistant professor in Forest Ecology	2,3,4,5,6,7,8	A
12	Issam Touhami	issam_touhami@yahoo.fr	Team member – Researcher -Forest Ecology	3,4,8	A
13	Samir Dhahri	dhahrisamir72@gmail.com	Team member – Assistant professor in Forest entomology	2,3,4,5,6,7,8	A

P8- EGE UNIVERSITY

short name: **UNIEGE**

	NAME AND SURNAME	EMAIL ADDRESS	ROLE	WP	PRESENCE
1	ÖZLEM KARAHAN UYSAL	ouysal4@gmail.com	Principal Investigator - Economist	1, 2, 3, 4, 5, 6, 7	P
2	SEBNEM TAVMAN	sebnemtavman@gmail.com	Team member – Food Engineer	1, 2, 5, 6	P
3	SERDAR GÖKHAN ŞENOL	sgsenol@yahoo.com	Team member – Ecologist Botanist Phytochemist	1, 2, 3	A
4	ÖZGÜR TATAR	tatar.ozgur@gmail.com	Team member – Chemical Engineer	1, 2, 3, 4	P
5	ZERRIN KENANOĞLU	zerrinbektas@hotmail.com	Team member – Agricultural Economist	1, 2, 7	P
6	DUYGU TOSUN	duygutosun@gmail.com	Team member – Agricultural Economist	1, 2, 7	P
7	CIGDEM SONMEZ	cigdemsnmz@gmail.com	Team member – Agronomist	1, 2, 3, 4	A
8	SEHER KUMCUOGLU	seherkumcuoglu@gmail.com	Team member – Food Engineer	1, 2, 5, 6	P
9	OGUZ BAYRAKTAR	oguzbayraktar70@gmail.com	Team member – Agronomist	1, 2, 5, 6	A

Legend: P Present, A Absent

1.3 AGENDA FOR THE MEETING

9 h 30 – 9 h 45

Opening of the meeting and communications from the Project coordinator

9 h 45 – 10 h 15

On-going activities and achievements related to project management and coordination (with the up-to-dated list of drafted/delivered deliverables)

- Presentation by WP1 Leader (Lucia Aquilanti, UNIVPM)
- Open discussion about WP1 issues

10 h 15 – 10 h 45

On-going activities and achievements related to communication and technology transfer (with the up-to-dated list of drafted/delivered deliverables)

- Presentation by WP2 Leader (Deborah Pacetti, UNIVPM)
- Open discussion about WP2 issues

10 h 45 – 11 h 15

On-going activities and achievements related to Characterization of Mediterranean sea fennel ecotypes (with the up-to-dated list of drafted/delivered deliverables)

- Presentation by WP3 Leader (Abdelhamid Khaldi, INRGREF)
- Open discussion about WP3 issues

11 h 15 – 11 h 45

On-going activities and achievements related to production of sea fennel organic crop (with the up-to-dated list of drafted/delivered deliverables)

- Presentation by WP4 Leader (Branimir Urlic, IACKR)
- Open discussion about WP4 issues

11 h 45 – 12 h 15

On-going activities and achievements related to exploitation of sea fennel for manufacturing of innovative sea fennel-based foods (with the up-to-dated list of drafted/delivered deliverables)

- Presentation by WP5 Leader (Valentina Melini, CREA-AN)
- Open discussion about WP5 issues

12 h 15 – 12 h 45

On-going activities and achievements related to valorisation of sea fennel crop by-products for production of functional food ingredients/nutraceuticals/soil amendments (with the up-to-dated list of drafted/delivered deliverables)

- Presentation by WP6 Leader Christian Magne (UNIBRE)
- Open discussion about WP6 issues

12 h 45 – 13 h 15

On-going activities and achievements related to demonstration of socio-economic benefits of the proposed innovations (with the up-to-dated list of drafted/delivered deliverables)

- Presentation by WP7 Leader Ozlem Uysal (UNIEGE)
- Open discussion about WP7 issues

13 h 15 – 13 h 45

On-going activities and achievements related to demonstration of environmental benefits of the proposed innovations (with the up-to-dated list of drafted/delivered deliverables)

- Presentation by WP8 Leader Daniele Duca (UNIVPM)
- Open discussion about WP8 issues

13 h 45

Expected closure of the meeting

1.4 MEETING MINUTES AND CONCLUSIONS

- **Opening of the meeting and communications from the Project coordinator**

The Project Coordinator opens the meeting at 9.30 a.m and welcomes the participants.

The Coordinator kindly reminds to PIs to regularly check in the shared folders up-loaded in GOOGLE DRIVE at https://drive.google.com/drive/folders/1zz194wTVswDVWx_5hF9mk-TJ01hxYBJx for drafting of deliverables and sharing of procedures/protocols.

The Coordinator shares with Consortium Partners the following information:

- ✓ SEAFENNEL4MED data have been correctly uploaded in the MEL platform (<https://mel.cgiar.org/user/login>); the latter has been approved by Prima IS and hence the up-loading of deliverables can now be start.
- ✓ Tentatively in November 2023 (corresponding to month 18), Project coordinator and Vice-Coordinator will be interviewed by an external expert together with Prima project officer, for the MIDTERM AUDIT. Such an interview will allow the Coordinator to illustrate the multiple activities carried out during the reporting period.
- ✓ The Coordinator remind to PIs and project team members to use the SEAFENNEL4MED WhatsApp group for sharing of pictures and videos; this also represents a tool for fast communication among PIs and WP leaders. Pictures are of crucial importance for the drafting of Newsletters, reports, and leaflets.
- ✓ The Coordinator kindly reminds the composition of Steering Committee and main roles of Work Package leaders, as detailed in original proposal approved.

SEAFENNEL4MED Steering Committee			
Chairman	UNIVPM	Lucia Aquilanti	e.mail: l.aquilanti@univpm.it phone: +39 071 2204959 mobile: +39 3403300366
Project Coordinator			
WP1 Leader			
WP2 Leader	UNIVPM	Deborah Pacetti	email: d.pacetti@univpm.it phone: +39 071 220 4685 mobile phone: 3483016689
WP3 Leader	INRGREF	Abdelhamid Khaldi	email: khalditn@yahoo.fr phone: +21671709033 mobile phone: +21697425066
WP4 Leader	IACKR	Branimir Urtic	email: branimir.urtic@krs.hr phone: +385 21 434 478 mobile phone: +385 98 896 362
WP5 Leader	CREA-AN	Valentina Melini	email: valentina.melini@crea.gov.it phone: +39 06 51494536 mobile phone:
WP6 Leader	UNIBRE	Christian Magne	email: christian.magne@univ-brest.fr mobile phone: +33 673 68 62 88 Telephone: +33 298 01 72 25
WP7 Leader	UNIEGE	Ozlem Uysal	email: ouysal4@gmail.com phone: +90 232 311 2972 mobile phone: +90 533 545 0223
WP8 Leader	UNIVPM	Daniele Duca	email: d.duca@univpm.it phone: +39 071 220 4631 mobile phone: +39 3337963762

The Steering Committee will be composed of the work package leaders (WP Leaders). It will direct the research priorities and activities of the consortium. The steering committee will meet (face-to-face or by teleconference) with the Coordinator at least once a month during the Project. If a member cannot attend a meeting, a written notification must be sent to the Coordinator. Chairman of this body is Prof. Lucia Aquilanti (Coordinator and Principal Investigator for UNIVPM). The main tasks of the Steering Committee are to set and revise Project's priorities and activities to ensure they are consistent with the contractual obligations with PRIMA call secretariat and funding agencies. The Steering Committee will also establish the national expert groups and to encourage and coordinate joint activities between the participants from different countries. The Steering committee will also organise the Quality Assurance Plan describing the guidelines adopted by the Project on preparation and validation of deliverables, internal peer reviewing, periodic reporting, preparation of financial statements, as well as risk management.

The Coordinator stresses the need that WP leader are more collaborative in planning specific meetings within their own WP to monitor the progresses of the activities and, most of all, in the drafting (with a continuous up-date!) of deliverables, with methods and main results from all the partners involved.

- **On-going activities and achievements related to WP1 - project management and coordination (with the up-dated list of drafted/delivered deliverables)**

As PI for WP1, the Project Coordinator Prof. Lucia Aquilanti shows a brief presentation (Annex I) illustrating the activities foreseen in WP1, as well as the list of deliverables for this WP. Both are shown as follows:

Tasks:

Task 1.1. Organization of general Project meetings **ON-GOING**

Task 1.2. Project coordination, management, supervision, and quality control **ON-GOING**

Task 1.3. Communication with PRIMA call secretariat and the funding Agencies **ON-GOING**

Task 1.4 Preparation of mid-term and final reports **NOT STARTED**

Deliverables:

D1.1 General Project meeting n.1 (Kick off meeting) Report (month 2) **DELIVERED IN DUE TIME ON 17TH JUNE 2022**

D1.2 Quality Assurance Plan (month 3). **DELIVERED IN DUE TIME ON 16TH JUNE 2022**

D1.3 General Project meeting n.2 Report (month 13); **TO BE DELIVERED BY 30 JUNE 2023**

D1.4 1st year (progress) Report (month 13); **TO BE DELIVERED BY 30 JUNE 2023**

D1.5 General Project meeting n.3 Report (month 19);

D1.6 General Project meeting n.4 Report (month 25);

D1.7 2nd year (progress) Report (month 25);

D1.8 General Project meeting n.5 Report (month 31);

D1.9 General Project meeting n.6 (Final workshop) (month 36);

D1.10 3rd year (final) Report (month 36)

Briefly, two deliverables (being D1.1 and D1.2) have been delivered within the deadline; two further deliverables (D1.3 and D1.4) will be soon delivered.

Regarding D1.5 and D1.6, the Coordinator propose to start planning the third and fourth general meetings, respectively. Prof Lucia Aquilanti strongly suggests the planning of in presence meetings to favour team building and

hence encourage the creation of links between researchers. After a brief discussion, the following tentative data and locations have been proposed:

General Project meeting n.3 (month 18)→ meeting in presence - NOVEMBER 2023

Host Institution: CREA-AN (Rome, Italy)

General Project meeting n.4 (month 24)→ meeting in presence - MAY 2024

Host Institution: UNIEGE (Ankara, Turkey)

- **On-going activities and achievements related to WP2 - communication and technology transfer (with the up-dated list of drafted/delivered deliverables)**

The Project Coordinator leaves the floor to Prof. Deborah Pacetti (UNIVPM), WP2 leader, who briefly presents the on-going activities and deliverables related to communication and technology transfer.

In her presentation (Annex II), Prof Deborah Pacetti shows the status of tasks and deliverables, which is reported as follows.

Tasks:

Task 2.1 Start-up activities **ON-GOING**

Task 2.2 Establishment of a stakeholder-platform and knowledge exchange network **ON-GOING**

Task 2.3 Installation and continuous up-date of SEAFENNEL4MED website **ON-GOING**

Task 2.4 Production of dissemination materials **ON-GOING**

Task 2.5 Documentation of scientific results **ON-GOING**

Task 2.6 Demonstration activities **NOT STARTED**

Deliverables:

D2.1 Project logo and communication templates (month 1); **DELIVERED IN DUE TIME**

D2.2 Public SEAFENNEL4MED website (month 2); **DELIVERED IN DUE TIME**

D2.3 SEAFENNEL4MED intranet (month 2); **DELIVERED IN DUE TIME**

D2.4 Press release at Project launch for the wide public (month 3); **DELIVERED IN DUE TIME**

D2.5 Establishment of a stakeholder platform for knowledge exchange network (month 6); **DELIVERED IN DUE TIME**

D2.6 SEAFENNEL4MED Data Management Plan (month 6); **DELIVERED IN DUE TIME**

D2.7 Demonstration activity 1: sea fennel harvesting campaign involving students (month 20) **TO BE DELIVERED BY 30 JANUARY 2024**

D2.8 Demonstration activity 2: presentation of sea fennel-based recipe book (month 34)

D2.9 Collection of 12 newsletters (month 36)

D2.10 At least 2 articles in divulgative journals/magazines (months 36)

D2.11 At least 4 open access papers published in international peer-reviewed journals (months 36)

D2.12 At least 4 conference proceedings (months 36)

D2.13 At least 1 downloadable Project leaflet (month 36)

D2.14 At least 1 video on new sustainable organic sea fennel cropping systems and applications of the new crops for production of food/food ingredients/nutraceuticals (month 36)

D2.15 Press release at Final Workshop (month 36)

D2.16 Attendance at almost 1 event/exhibition aimed at promoting Mediterranean agri-food products where the supply and demand can encounter each other and the researchers (month 36)

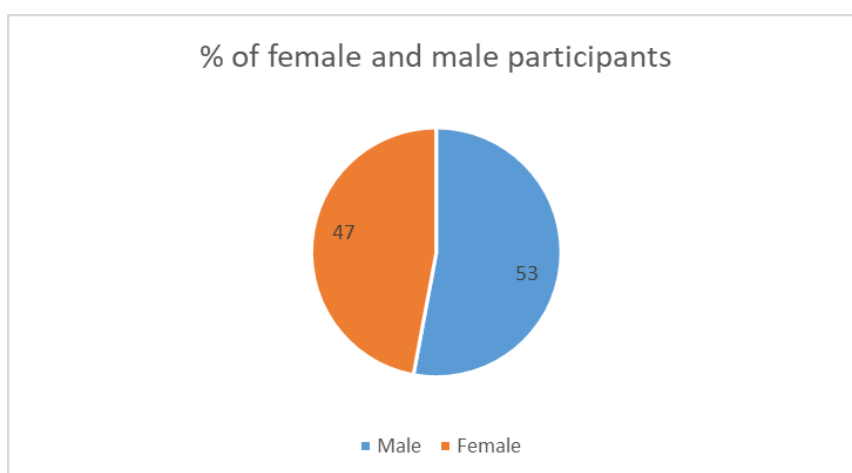
Briefly, six deliverables (from D2.1 to D2.6 have successfully been delivered. For D2.3, prof Deborah Pacetti clarifies that two systems for internal communication were implemented, being SharePoint as interoperable system and Google Drive as consultation system.

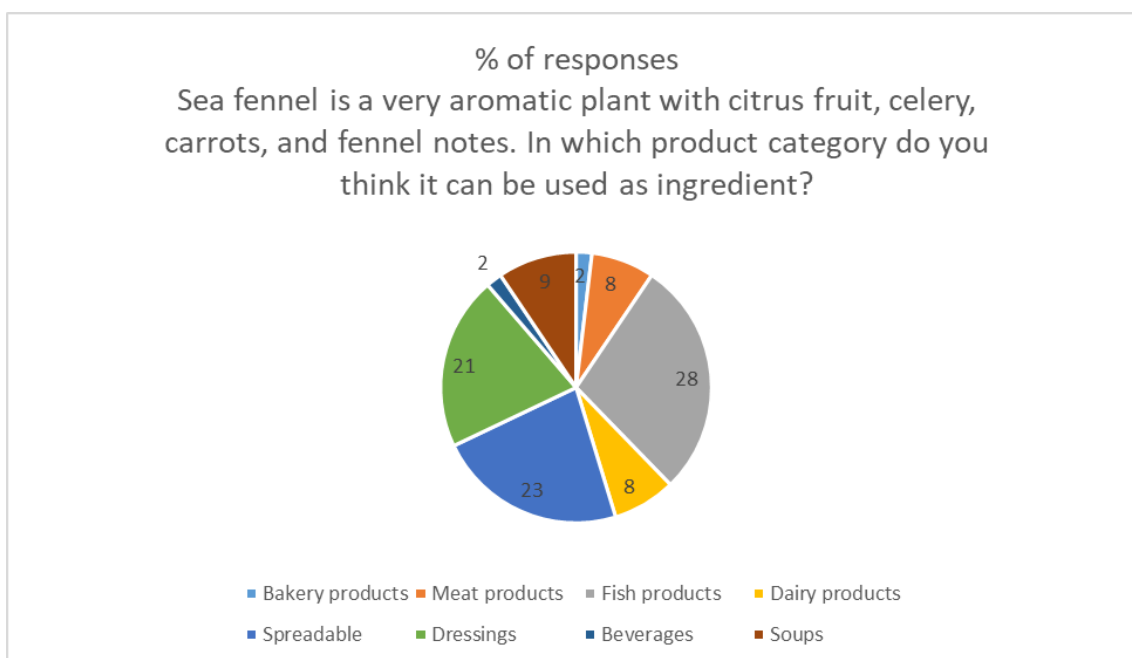
- ✓ SharePoint was used for editable files and work in progress documents where the PIs and their team members were given access upon request. This system is interoperable and controlled. The tracking of the modification and the simultaneous editing features of SharePoint allows a collaborative approach and easy exchange of feedbacks. The SharePoint site was organized in folders according to the WPs where the files were stored. After collaborative and online editing of the team members, the files were approved by the WP leader and stored in Google drive repository.
- ✓ Google Drive was used to create a shared repository where only people with access (PIs) can open with the link (https://drive.google.com/drive/folders/1zz194wTVswDVWx_5hF9mk-TJ01hxYBJx?usp=sharing). The shared folder was organized in subfolders named WP1, WP2, WP3, WP4, WP5, WP6, WP7, WP8 where the files were approved by each PIs and definitive different format of files were stored and accessible only for reading and downloading.

For D2.4 Press release at Project launch for the wide public (month 3), 9 press releases were overall released, 8 from ITALY and 1 from CROATIA.

For D2.5, a Stakeholder platform including 111 Stakeholders has been established. A first example of collaborative and facilitated exchange of knowledge between Stakeholders and Consortium partners is given by the implementation (in October 2022) of an on-line multi-language survey (translated in the 6 official project languages: ARAB, CROATIAN, ENGLISH, FRENCH, ITALIAN and TURKISH) (Annex IX) aimed at collecting suggestions from the project Stakeholders about new foods and/or food ingredients to be developed within WP5.

The results of this survey are summarized as follows:





Suggestions from Project stakeholders to the question *"Describe your ideal sea fennel-based food"*

- Baked white fish with sea fennel
- Bruschetta with mayonnaise sauce
- Cheese spread with minced parsley
- Cold salads
- Condiment of sea fennel
- Dairy products with sea fennel
- First course with sea-fennel
- Pasta sauce
- Pizza mortadella, stracciatella cheese and sea fennel
- Pizza topping
- Risotto with sea fennel
- Salad
- Salami with sea-fennel
- Sea fennel flavored EVO oil
- Sea fennel beer
- Snack
- Tuna paté

- **On-going activities and achievements related to WP3 - characterization of Mediterranean sea fennel ecotypes (with the up-dated list of drafted/delivered deliverables)**

The Project Coordinator leaves the floor to Dr Faten Mezni (Delegate of WP3 Leader Prof. Abdelhamid Khaldi), who briefly presents the on-going activities and deliverables related to characterization of Mediterranean sea fennel ecotypes (with the up-dated list of drafted/delivered deliverables).

In her presentation (Annex III) Dr Faten Mezni shows the status of tasks and deliverables, which is reported as follows.

Tasks:

Task 3.1 (RES). Sampling and morphological characterization of spontaneously growing sea fennel populations **ON-GOING**

Task 3.2 (RES) Chemical analysis of dried sea fennel aerial parts/seeds **ON-GOING**

Task 3.3 (RES). Molecular analysis of sea fennel aerial parts **ON-GOING**

Task 3.4 (RES) Elaboration of morphological, chemical, and genetic data for potential identification of different ecotypes **NOT STARTED**

Deliverables:

D3.1 Dried sea fennel biomass (leaves, stems, flowers) from at least 5 Mediterranean spontaneous sea fennel populations (month 6) **DELIVERED IN DUE TIME ON 30TH NOVEMBER 2022**

D3.2 Catalogued and stored seeds (≥ 2500) from at least 5 Mediterranean sea fennel populations (month 8 $\rightarrow$ 30.01.2023) **DELIVERED IN DUE TIME ON 30TH JANUARY 2023**

D3.3 Selected Mediterranean sea fennel germplasm (at least 1 ecotype) for cultivation (month 10 $\rightarrow$ 30.03.2023) **DELIVERED IN DUE TIME ON 30TH MARCH 2023**

D3.4 Report with elaborated data overall collected within WP3 (month 10 $\rightarrow$ 30.03.2023) **DELAYED**

Briefly, as agreed at the WP3 meeting held in July 2022 and reported in the shared WP3 protocol available at https://drive.google.com/drive/folders/1zz194wTVswDVWx_5hF9mk-TJ01hxYBJx, **at least 4 sites (with a minimum distance of about 100 km between sites)** were identified in each almost all countries involved in this WP, except for France (as detailed as follows) for sampling of wild sea fennel populations.

Italy: P1 – UNIVPM $\rightarrow$ 10 sites

Croatia: P4 – UNIST & P5 – IACKR $\rightarrow$ 10 sites

France: P5 – UNIBRE $\rightarrow$ 1 site

Tunisia: P7 – INRGREF $\rightarrow$ 5 sites

Turkey: P8 – EGE $\rightarrow$ 4 sites

As planned, a first harvest was carried out in August/September 2022 to collect leaves and flowers whereas a second harvest was carried out in September/November 2022 to collect seeds.

Given that *Crithmum maritimum* L. is a sparse plant, the sampling on transects method was selected as more appropriate (Wahid et al., 2018). For each population, 20 individuals were sampled, collecting leaves (IN SEPARATED BAGS and coded with a unique alphanumeric code) flowers, and seeds.

Regarding leaves, 5 g per individual were stored apart for genetic analyses.

The morphometric analyses are on-going in all countries, as well as extraction of nucleic acids; seeds have been properly stored in national/local seedbanks.

Dr Faten Mezni opens the discussion; prof. Simona Casavecchia (Botanist working at UNIVPM) suggests that for France, beyond to the population sampled in Brittany shoreline at Porsévigné (Finistère) in October 2022, other 3 sites might be also considered for sampling: 1 in Corsica Island (western coast, in front of Spain); 1 in Liguria; and 1 in the French Riviera (South of France). The team of Botanists working at UNIVPM will make the sampling in Summer 2023; data collected will be used, together with those referring to the sampled Italian populations, to identify different ecotypes in western Mediterranean basin (Italy + south France). The Consortium agrees about this proposal.

Regarding the genetic analyses foreseen in Task 3.3, the Consortium Partners agree to take advantage of the sequencing service offered by one company (to obtain fully comparable data). At this regard, the coordinator proposes to all botanists involved in this WP to ask for quotations to different companies in their own countries to compare costs and allow the Consortium to choose the best option (in terms of price/quality ratio). All the quotations will be shared with the WP3 Leader who is invited to schedule a WP3 meeting to take a final decision about, as soon as at least 3 quotations are available.

- **On-going activities and achievements related to WP4 - production of sea fennel organic crop (with the up-dated list of drafted/delivered deliverables)**

The Project Coordinator leaves the floor to the WP4 leader Dr Branimir Urlic from IACKR who briefly presents the on-going activities and deliverables related to production of sea fennel organic crop (with the up-to-dated list of drafted/delivered deliverables) (Annex IV). The status of the tasks and deliverables is reported below.

Tasks:

Task 4.1 (R). Sustainable production of sea fennel crop in demo field (month 6 – 24). **ON-GOING**

Task 4.2 (D). Sustainable production of sea fennel crop in open field (month 12 – 35). **ON-GOING**

Task 4.3. (D) Analysis of the new sea fennel crops (month 6 – 35). **NOT STARTED**

Task 4.4. (D) Statistical analysis (month 18 – 35). **NOIT STARTED**

Deliverables:

D4.1 Experimental plan design of cultivation trials (month 6); **DELIVERED IN DUE TIME ON 30TH NOVEMBER 2022.**

D4.2 Fresh biomass (edible aerial parts) from the new organic sea fennel crops (month 12); **DELAYED**

D4.3 By-products (old leaves and fibrous stems) from the new organic sea fennel crops (month 12); **DELAYED**

D4.4 Recommendations and guidelines on sustainable production of new organic sea fennel crops in the Mediterranean basin (Month 24).

D4.5 Report with the elaborated data overall collected within WP4 (month 35)

Briefly, in all the countries involved in the cultivation trials, germination tests have been carried out in growth chamber and/or greenhouse to evaluate the germination rate, which seems to attest in average at ~50-60% for most of the ecotypes assayed. Since this rate is notably lower than that expected (90%) a downscale of the cultivation trials is recommended by the WP4 Leader, with a drastic reduction of the number of transplanted seedlings per experimental field. Even for WP4, the Consortium partners involved suggest scheduling a specific meeting once that all germination tests are completed in each country, and the number of seedlings available for transplanting is available.

Regarding soil bed preparation and soil analyses, these are on-going in all the involved Consortium partners.

In Italy, a bio-fertilizer including selected strains of beneficial bacteria has been formulated and successfully applied to seeds bacterization to evaluate its impact on the root and the rhizosphere, The preliminary results suggest a positive effect of the bio-fertilizer application on key root parameters.

- **On-going activities and achievements related to WP5- exploitation of sea fennel for manufacturing of innovative sea fennel-based foods (with the up-dated list of drafted/delivered deliverables)**

The Project Coordinator leaves the floor to the WP5 leader Dr Valentina Melini from CREA-AN who briefly presents the on-going activities and deliverables related to exploitation of sea fennel for manufacturing of innovative sea fennel-based foods (with the up-to-dated list of drafted/delivered deliverables) (Annex V). The status of the tasks and deliverables is reported below.

Tasks:

Task 5.1 (R) Laboratory scale manufacturing of fermented shelf-stable sea-fennel preserves at laboratory scale (month 1 – 20). **ON-GOING**

Task 5.2 (R) Laboratory-scale manufacturing of unfermented shelf-stable preserves (month 1 – 20). **ON-GOING**

Task 5.3 Pilot-scale manufacturing of fermented and unfermented shelf-stable sea-fennel preserves (D) (month 20 – 35). **NOT STARTED**

Deliverables:

D5.1 At least 2 pilot scale prototypes of sea fennel-based fermented shelf stable preserves (month 24) **TO BE DELIVERED BY 30TH April 2024;**

D5.2 At least 2 pilot scale prototypes of sea fennel-based unfermented shelf stable preserves (month 24) **TO BE DELIVERED BY 30TH April 2024;**

D5.3 Recommendations and guidelines for manufacturing of new sea fennel-based fermented shelf-stable preserves at pilot scale (month 35);

D5.4 Recommendations and guidelines for manufacturing of new sea fennel-based unfermented shelf-stable preserves at pilot scale (month 35);

D5.5 Report with elaborated data overall collected within WP5 (month 35)

Briefly, for the innovative FERMENTED SEA FENNEL FOODS, 2 laboratory-scale prototypes have already been developed including:

- 1 Kimchi-like preserve (ITALY, UNIVPM)
- Fermented sea fennel sprouts in vinegar (ITALY, UNIVPM)

The validation of these prototypes through chemical, microbiological, textural, and sensory analysis are currently ongoing.

For the innovative UNFERMENTED SEA FENNEL FOODS, preparatory studies were carried out for production of:

- Dried spices (CROATIA, UNIST)
- Dalmatian pâté (CROATIA, UNIST)
- Pickled sea fennel (CROATIA, UNIST).

In parallel, the following laboratory-scale prototypes were formulated:

- Chili puree (harissa) (TUNISIA, INRGREF)
- Orange jam (TUNISIA, INRGREF)
- Noodles prepared with durum semolina added with 5% or 10% sea fennel powder (TURKEY, UNIEGE).

Even for these prototypes, the validation analyses are on-going.

After her presentation, Dr Valentina Melini opens the discussion. Prof. Ivana Generalić Mekinić requests some clarifications about the interpretation of what stated in the original proposal about the exploitation of the new sea fennel crops (produced at the experimental fields within the Project) for the manufacturing of the new food prototypes in WP5.

The Coordinator clarifies that due to delays in the transplanting of seedlings, it can be ~~esteemed~~ **estimated** that the first harvest of considerable quantities of tender leaves and stems might only be done in two years (May-June 2025), **hence the laboratory-scale prototypes have to be produced using organic sea fennel crop currently available on the market (or provided by Rinci, PARTY 3, which actually produces its own organic sea fennel crop from the Marche ecotype, this latter corresponding to the Italian ecotype selected for the cultivation at the Italian demo field).**

The Coordinator proposes to Partners involved in this WP to make a search in their own countries for organic sea fennel crop providers; in alternative, those countries where no commercial sea fennel crop is available could request to Rinci (PARTY 3) to provide them from June to September 2023 a small quantitative of sea fennel crop (5 – 10 Kg maximum).

Finally, the Coordinator kindly reminds what planned by the different Partners within this WP (details below) and the need to soon start the formulation of laboratory-scale prototypes of new sea fennel-based foods.

P1 (UNIVPM)

FERMENTED PROTOTYPES (T5.1)

- BEER (addition of extracts produced in WP6 or of fresh sea fennel leaves/flowers during boiling) (TEAM PROF PACETTI & PROF AQUILANTI)
- KIMCHII-LIKE PRESERVE (natural and started fermentation of mixtures of vegetables including sea fennel sprouts) (TEAM PROF AQUILANTI & PROF MOZZON)
- FERMENTED SEA FENNEL IN VINEGARD (TEAM PROF AQUILANTI)

UNFERMENTED PROTOTYPES (T5.2)

- SHELF-STABLE PESTO-LIKE (optimization of the pasteurization process and evaluation of microbiological stability by accelerated growth tests and challenge tests) (TEAM PROF AQUILANTI & PROF MOZZON)

P2 (CREA-AN)

- VALIDATION OF THE NEW PROTOTYPES DEVELOPED BY P1-UNIVPM

P3 (RINCI)

- PROVIDING to UNIVPM OF SEA FENNEL CROP (EDIBLE FRESH LEAVES – SPROUTS) FOR development, production, and validation of new sea fennel-based foods.
- PRODUCTION OF PILOT-SCALE PROTOTYPES

P4 (UNIST)

UNFERMENTED PROTOTYPES (T5.2)

- Dried spices formulated with blends of sea fennel and other Mediterranean aromatic herbs
- Dalmatian pâté with sea fennel and onions

- Pickled sea fennel: formulation using different vinegars (apple, grape, etc)

P7 (INRGREF)

UNFERMENTED PROTOTYPES (T5.2)

- Chili puree (Harissa)
- Jam
- Snack

P8 (UNIEGE)

UNFERMENTED PROTOTYPES (T5.2)

- Snacks obtained by extrusion starting from (a) doughs made with sea fennel and other ingredients and (b) stuffed with sea fennel cream.
- Spiced noodles with sea fennel

- **On-going activities and achievements related to WP6- valorisation of sea fennel crop by-products for production of functional food ingredients/nutraceuticals/soil amendments (with the up-dated list of drafted/delivered deliverables)**

The Project Coordinator leaves the floor to the WP6 leader Prof Christian Magné from UNIBRE who briefly presents the on-going activities and deliverables related to valorisation of sea fennel crop by-products for production of functional food ingredients/nutraceuticals/soil amendments (with the up-to-dated list of drafted/delivered deliverables) (Annex VI). The status of the tasks and deliverables is reported below.

Tasks:

Task 6.1 (R&D). Preparation and analysis of extracts from sea fennel crop by-products (month 12 – 18). **ON-GOING**

Task 6.2 (R&D) Exploitation of the extracts as functional food ingredients and nutraceuticals (month 18 – 24). **NOT STARTED**

Task 6.3 (R&D) Composting of residual sea fennel biomass (month 24 – 35).

New Task 6.4 (R&D) Production, analysis and exploitation of essential oils (EOs) from sea fennel as food ingredients with antimicrobial activity/beneficial properties applied to the manufacture of Mediterranean foods (e.g.: cheeses, fermented sausages, ect). (month 24 – 35) **ON-GOING**

Deliverables:

D6.1 At least 1 crude extract with antioxidant, antimicrobial and/or health-beneficial activity (month 18); **TO BE DELIVERED BY 30TH NOVEMBER 2023**

D6.2 Recommendations and guidelines for preparation of crude extracts with antioxidant, antimicrobial and/or health-beneficial activity from sea fennel (month 18);

D6.3 At least 1 soil amendment produced by composting of sea fennel crop residual biomass (month 35);

D6.4 Recommendations and guidelines for preparation of soil amendment by composting of sea fennel residual biomass (month 35);

D6.5 Report with elaborated data overall collected within WP6 (month 35)

Briefly, Prof Christian Magné illustrates the progresses related to this WP for each Consortium Partner involved (as detailed below).

- ITALY (UNIVPM): By-product of organic fennel crop currently produced at open field by Rinci (PARTY3), composed by woody stems, old leaves, and flowers was manually harvested from the field and air-dried; about 0,5 g of dried powder of the sample was destined to the production of an aqueous extract, which was further freeze-dried and subjected to the following on-going analyses: determination of total phenolic content (TPC), carotenoids, tocopherols.

The Coordinator kindly reminds what agreed at the last WP6 meeting held in July 2022 and reported in the shared protocol about what planned by each partner involved in this WP.

More in detail, for the formulation of **NEW FOOD INGREDIENTS**:

P1 – UNIVPM

- production of extracts with polar bioactive compounds and analysis of their chemical, anti-oxidant and antimicrobial activities (the latter towards key foodborne pathogens: Escherichia coli, Staphylococcus aureus, Listeria monocytogenes) (TEAM Prof PACETTI and AQUILANTI)
- production and validation of seasonig edible capsules (from the extracts produced in T6.1 or essential oils produced in T6.3) e.g., example balsamic modena vinegard (spherification process using sodium alginate) (TEAM Prof PACETTI)
- application of essential oils produced in T6.3 into the production of fermented salami (es. ciauscolo) to improve sensory traits/safety/funtional properties (TEAM Prof AQUILANTI)
- application of essential oils produced in T6.3 into the production of meat-based products (e.g., hamburger) to improve sensory traits/safety/funtional properties (example 3) (TEAM Prof AQUILANTI)

P2 – CREA-AN

- validation of the new food ingredients developed by UNIVPM and/or extraction of essential oil from residues of sea fennel crop provided by Rinci

P3 – RINCI

- providing to univpm of residues of sea fennel crop (e.g., non edible woody leaves – stems, autumn mowing) for development, production and validation of new food ingredients.

P4-UNIST

- extraction and analysis of essential oils (EOs) at laboratory scale;
- addition of EOs to different vegetable oils in order to prevent their degradation (oxidation) and as flavour components.

P7- INRGREF

- extraction and analysis of essential oils (EOs);
- application of EOs as food ingredients to improve quality/shelf-life of jelly candies

Regarding the formulation of **NUTRACEUTICALS**:

P1 – UNIVPM

- Production of extracts with polar bioactive compounds and analysis for their chemical/antioxidant/antimicrobial traits
- Application of the extracts with polar bioactive compounds to produce edible capsules (in gelatine)

P2 – CREA-AN

- Validation of the nutraceuticals developed by P1-UNIVPM and/or extraction of essential oil from residues of sea fennel crop provided by Rinci

P3 – RINCI

- PROVIDING to P1-UNIVPM OF DRIED RESIDUES OF SEA FENNEL CROP (e.g., NON-EDIBLE WOODY LEAVES – STEMS, autumn mowing) FOR development, production, and validation of nutraceuticals.

P6 – UNIBRE

- analysis of beneficial effects of the watery extracts with polar bioactive compounds on the human health: antidiabetic and anti-inflammatory activity (UNIBRE is available for carrying out these analyses on the extracts produced by the different CONSORTIUM partners)

P7- INRGREF

- Use the by-products of sea fennel in animal feed formulate (concentrates or vegetable flours) based on sea fennel or mixed with other products. We propose to test their effectiveness on average daily gain (for the ruminants).
- Use aqueous extracts for animal nutrition and try to find out if it influences the quality of meat.
- Test the antioxidant, anti-diabetic, antifungal and insecticidal effects of aqueous extracts and essential oils of sea fennel by-products.

P8 – UNIEGE

- Encapsulation of standardized crude extract with polar bioactive compounds (one extract obtained at optimum extraction conditions) in micro- and nano-carriers and evaluation of stability (UV, heat).
- Evaluation of health-beneficial traits of a standardized crude extract with polar bioactive compounds (one extract obtained at optimum extraction conditions): anti-diabetic effects using enzyme (alfa-glucosidase) inhibition assays.
- Preparation of mucoadhesive oral films (oral strips) at lab scale for the buccal delivery of polar bioactive compounds in standardized crude extract (only for one extract obtained at optimum extraction conditions).
- Evaluation of the synergistic effects of a standardized crude extract with polar bioactive compounds (one extract obtained at optimum extraction conditions) with selected bio-enhancers.

Finally, concerning the production of **SOIL AMENDANTS**:

P5-IACKR

- Laboratory-scale composting trials with the residues of sea fennel biomass after extraction of polar/non polar bioactive compounds

The Coordinator also kindly reminds what agreed by the Consortium Partners involved in this WP about the fact that all these PARTENERS WILL COLLECT INDEPENDENTLY SEA FENNEL CROP RESIDUES/BYPRODUCTS (WITH NO CONTRIBUTION EXPECTED FROM RINCI).

- **On-going activities and achievements related to WP7 - demonstration of socio-economic benefits of the proposed innovations (with the updated list of drafted/delivered deliverables)**

The Project Coordinator leaves the floor to the WP7 leader Prof. Ozlem Ouyal from UNIEGE who briefly presents the on-going activities and deliverables related to demonstration of socio-economic benefits of the proposed innovations

(with the up-to-dated list of drafted/delivered deliverables) (Annex VII). The status of the tasks and deliverables is reported below.

Tasks:

Task 7.1 (D) Identification of drivers and lock-ins for the development of sea-fennel products (month 1– 12). **ON-GOING**

Task 7.2 (D) Assessment of consumer attitudes and acceptance of sea fennel products (month 13–30). **NOT STARTED**

Task 7.3 (D) Business model evaluation (month 24 – 35). **NOT STARTED**

Deliverables:

D7.1 Lock-ins and drivers for the development of sea-fennel products (month 12); **DELAYED**

D7.2 Report on consumer research on the attitudes and acceptance of sea-fennel products (month 30);

D7.3 Report on Business Model Evaluation (month 35)

Briefly, Prof. Ozlem Ouysal summarizes all the activities carried out during the reporting period. These are detailed as follows:

- Two meetings were held within the scope of WP7: one with the general participation of the Consortium partners (20 December 2022), and the other with the project partners who will be involved in WP7 (13 February 2023).
- Following the first meeting, the implementation protocol of WP7 was prepared and made available to the project partners on the project information sharing platform (SEAFENNEL4MED_Sharing_Platform on Google Drive)
- After the second meeting, the minutes including the action plan and dates related to Task 7.1 were shared with the partners through the platform.
- Accordingly, the questionnaire to be used in the first round of the Delphi survey within the framework of the action plan was finalised with the cooperation of UNIVPM and the questionnaire was uploaded to Qualtrics, a data collection and analysis software, for implementation. Currently, the translations of the first round of the survey questionnaire into local languages for implementation in different countries were checked and the partners are trying the survey on Qualtrics. The participant lists per country were determined. The survey is about to start.

In her presentation, Prof. Ozlem Ouysal illustrates the activities foreseen for the next 6 months, as detailed as follows:

- Delphi survey second and third rounds will be completed (30th June 2023)
- Deliverable 7.1 (15 July 2023)
- Consumer populations to be surveyed for Task 7.2 determined (15th July 2023)
- Question form to be used for the consumer survey finalized (September 2023)
- The next step will be conducting the survey (until December 2023)

The Consortium partners take notes of the road map planned for WP7.

- **On-going activities and achievements related to WP8 - demonstration of environmental benefits of the proposed innovations (with the up-dated list of drafted/delivered deliverables)**

The Project Coordinator leaves the floor to the WP8 leader Prof. Daniele Duca from UNIVPM who briefly presents the on-going activities and deliverables related to demonstration of environmental benefits of the proposed innovations (with the up-to-dated list of drafted/delivered deliverables) (Annex VIII). The status of the tasks and deliverables is reported below.

Tasks:

Task 8.1 (D) Sustainability assessment of sea fennel open field production (month 1-35). **ON-GOING**

Task 8.2 (D) Sustainability assessment of new sea fennel-based foods/food ingredients (month 1-35). **ON-GOING**

Task 8.3 (D) Sustainability assessment of functional extracts for food ingredients/nutraceuticals (month 1- 35). **ON-GOING**

Deliverables:

D8.1 Report on sustainability assessment of fresh sea fennel carried out by LCA from data collected thanks to WP4 activities (month 35);

D8.2 Report on sustainability assessment of processed sea fennel products carried out by LCA from data collected thanks to WP5 activities (month 35);

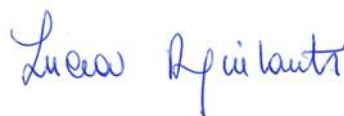
D8.3 Report on sustainability assessment of sea fennel residues extracts from data collected thanks to WP6 activities (month 35)

Briefly, Prof. Daniele Duca illustrates the methods to be adopted for Life Cycle Assessment according to ISO 14040 and ISO 14044 with a few case studies related to various crops and food products. Additional reference documents and scientific papers were reported for guiding LCA in the different tasks. For each task a list for data collection has been drafted. Among the activities, a WP8 meeting with the general participation of the Consortium partners was held on 20 December 2022. Another meeting between UNIVPM and RINCI was held on 13 April 2023 at RINCI premises to draft data collection.

As there was nothing else to discuss, the project Coordinator declares the session closed at 12.30.

SEAFENNEL4MED Project Coordinator

Prof. Lucia Aquilanti PhD



1.5 ANNEX I - WP1 PRESENTATION

– Prof Lucia Aquilanti (Project Coordinator – WP1 Leader)



AGENDA 2ND GENERAL MEETING PRIMA FUNDED PROJECT UNDER THE 2021 CALL

"Innovative sustainable organic sea fennel (Crithmum maritimum L.)-based cropping systems to boost agrobiodiversity, profitability, circularity, and resilience to climate changes in Mediterranean small farms"

Acronym **SEAFENNEL4MED**

11 MAY 2023, ON-LINE MEETING

9 h 30 – 9 h 45

Opening of the meeting and communications from the Project coordinator

9 h 45 – 10 h 15

- **WP1 Leader (Lucia Aquilanti, UNIVPM)**
Presentation of on-going activities and achievements related to project management and coordination (with the up-to-dated list of drafted/delivered deliverables)
- **Open discussion about WP1 issues**

10 h 15 – 10 h 45

- **WP2 Leader (Deborah Pacetti, UNIVPM)**
Presentation of on-going activities and achievements related to communication and technology transfer (with the up-to-dated list of drafted/delivered deliverables)
- **Open discussion about WP2 issues**

10 h 45 – 11 h 15

- **WP3 Leader (Abdelhamid Khaldi, INRGREF)**
Presentation of on-going activities and achievements related to Characterization of Mediterranean sea fennel ecotypes (with the up-to-dated list of drafted/delivered deliverables)
- **Open discussion about WP3 issues**

11 h 15 – 11 h 45

- **WP4 Leader (Branimir Uroic, IACR)**
Presentation of on-going activities and achievements related to production of sea fennel organic crop (with the up-to-dated list of drafted/delivered deliverables)
- **Open discussion about WP4 issues**

11 h 45 – 12 h 15

- **WP5 Leader (Valentina Malini, CREA-AN)**
Presentation of on-going activities and achievements related to exploitation of sea fennel for manufacturing of innovative sea fennel-based foods (with the up-to-dated list of drafted/delivered deliverables)
- **Open discussion about WP5 issues**

12 h 15 – 12 h 45

- **WP6 Leader Christian Magne (UNIBRE)**
Presentation of on-going activities and achievements related to valorisation of sea fennel crop by-products for production of functional food ingredients/nutraceuticals/soil amendments (with the up-to-dated list of drafted/delivered deliverables)
- **Open discussion about WP6 issues**

12 h 45 – 13 h 15

- **WP7 Leader Ozlem Uysal (UNIEGE)**
Presentation of on-going activities and achievements related to demonstration of socio-economic benefits of the proposed innovations (with the up-to-dated list of drafted/delivered deliverables)
- **Open discussion about WP7 issues**

13 h 15 – 13 h 45

- **WP8 Leader Daniele Duca (UNIVPM)**
Presentation of on-going activities and achievements related to demonstration of environmental benefits of the proposed innovations (with the up-to-dated list of drafted/delivered deliverables)
- **Open discussion about WP8 issues**

13 h 45

Expected closure of the meeting

Communications from the Project coordinator

- MEL platform
- November 2023: 18th month → MIDTERM AUDIT through an interview with an external Expert and Prima project officer



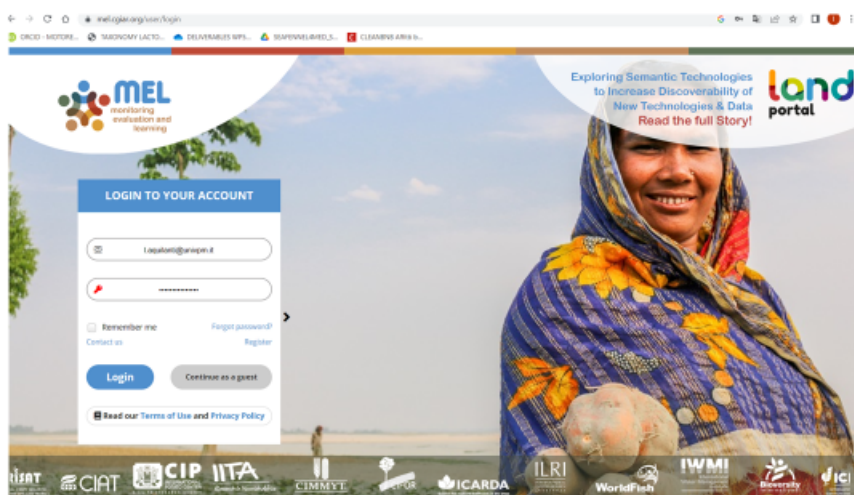
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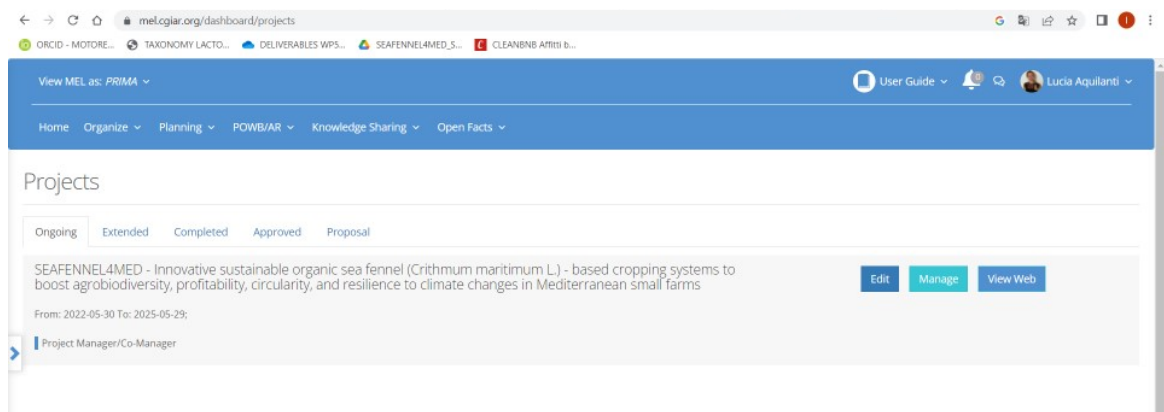
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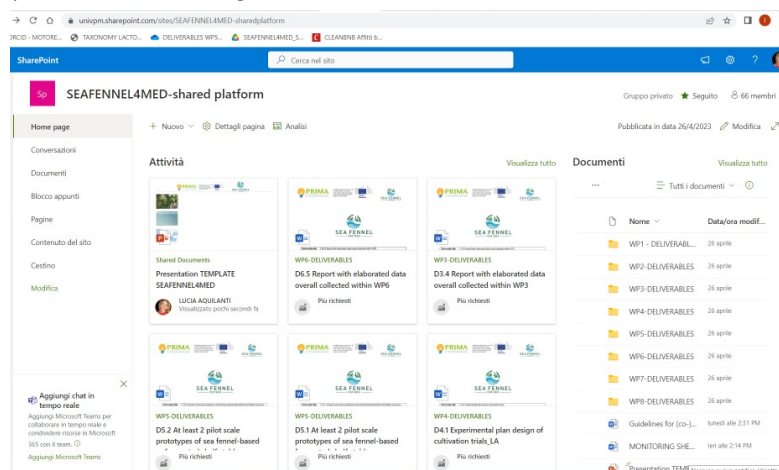
🌐 prima-med.org



<https://mel.cgiar.org/user/login>



- SEAFENNEL4MED shared platform on sharepoint: how to manage the access to the platform, the integration of deliverables, publications monitoring sheet etc.

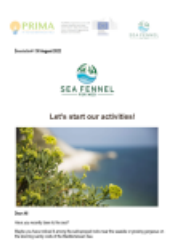


- SEAFENNEL4MED whatsapp group: a tool for sharing of pictures and videos



Imported by WhatsApp

Deliverables: D2.1 Project logo and communication templates (month 1); D2.2 Public SEAFENNEL4MED website (month 2); D2.3 SEAFENNEL4MED intranet (month 2); D2.4 Press release at Project launch for the wide public (month 3); D2.5 Establishment of a stakeholder platform for knowledge exchange network (month 6); D2.6 SEAFENNEL4MED Data Management Plan (month 6); D2.7 Demonstration activity 1: sea fennel harvesting campaign involving students (month 20); D2.8 Demonstration activity 2: presentation of sea fennel-based recipe book (month 34); D2.9 Collection of 13 newsletters (month 36); D2.10 At least 2 articles in divulgation journals/magazines (months 36); D2.11 At least 4 open access papers published in international peer-reviewed journals (months 36); D2.12 At least 4 conference proceedings (months 36); D2.13 At least 1 downloadable Project leaflet (month 36); D2.14 At least 1 video on new sustainable organic sea fennel cropping systems and applications of the new crops for production of food/food ingredients/nutraceuticals (month 36); D2.15 Press release at Final Workshop (month 36); D2.16 Attendance at almost 1 event/exhibition aimed at promoting Mediterranean agri-food products where the supply and demand can encounter each other and the researchers (month 36).



- Minutes of the 2nd general meeting: how to manage



Deliverable title:	D1.3 General Project meeting n.2 Report
Deliverable Lead:	UnivPM
Related Work:	WP1 - Project coordination and overall management
Package:	
Related Task:	T1.1 Organization of general Project meetings
Author(s):	Lucia Aquilanti
Dissemination level:	PU
Due Submission Date:	30.05.2023
Actual submission:	18.05.2023
Start date of project:	30.05.2022
Duration:	36 months
Abstract:	Minutes of the general project meeting n.2, held on-line on 11 th May 2023

Versioning and Contribution History

Version	Date	Modified by	Modification reason
v1.0	15/05/2023	Lucia Aquilanti	First version
V2.0	18/05/2023	Lucia Aquilanti	Comments after peer review process

P1- Università Politecnica delle Marche

short name: UNIVPM

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7	STEFANO ZENONI	s.zenoni@univpm.it	WP1 Leader	1, 2, 8	
8	ROBERTO CERINI	r.cerini@univpm.it	Agripreneur Engineer		
9	RAFFAELLA TULLA	r.tulla@univpm.it	Team member - Student	1, 2, 3	
10	SANDRA NARISSETTI	s.narissetti@univpm.it	Team member - Agripreneur	1, 2, 4	
11	SAFFI NELL'AMALI	s.nell'amali@univpm.it	Team member - Post-Doc Researcher	1, 2, 4	
12	VERENA MILANOVIĆ	v.milano@univpm.it	Team member - Agripreneur	1, 2, 7	
13	ANTONIO TUMACONE	a.tumacone@univpm.it	Team member - Agripreneur	1, 2, 7	
14	ANDREA MARCILLI	a.marcilli@univpm.it	Team member - Post-Doc Researcher	1, 2, 3	
15	ANTONIO TUMACONE	a.tumacone@univpm.it	Team member - Post-Doc Researcher	1, 2, 3	
16	MASSIMO MUZZI	m.muzzi@univpm.it	Team member - PhD Student	1, 2, 3	
17	FILIPPO LAURENZI	f.laurenzi@univpm.it	Team member - Food technologist	1, 2, 3	
18	FILIPPO LAURENZI	f.laurenzi@univpm.it	Team member - Research fellow	1, 2, 3	

P2- Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria

short name: CREA-AN

1	NAME AND SURNAME	EMAIL ADDRESS	ROLE	WP	PRESIDENCE
1	Antonio Nelli	antonio.nelli@crea.gov.it	Principal Investigator - Food channel	1, 2, 3, 4, 5, 6	
2	Faniella Simoni	faniella.simoni@crea.gov.it	Team member - Senior researcher in sensory and consumer science	4, 5, 6	
3	Isabella Moroni	isabella.moroni@crea.gov.it	Team member - Technical Collaborator for Research	4, 5, 6	
4	Maria Papagno	maria.papagno@crea.gov.it	Team member - Technical Collaborator for Research	4, 5, 6	

- WP leaders: a remind of main roles

The Steering Committee will be composed of the work package leaders (WP Leaders). It will direct the research priorities and activities of the consortium. The steering committee will meet (face-to-face or by teleconference) with the Coordinator at least once a month during the Project. If a member cannot attend a meeting, a written notification must be sent to the Coordinator. Chairman of this body is Prof. Lucia Aquilanti (Coordinator and Principal Investigator for UNIVPM). The main tasks of the Steering Committee are to set and revise Project's priorities and activities to ensure they are consistent with the contractual obligations with PRIMA call secretariat and funding agencies. The Steering Committee will also establish the national expert groups and to encourage and coordinate joint activities between the participants from different countries. The Steering committee will also organise the Quality Assurance Plan describing the guidelines adopted by the Project on preparation and validation of deliverables, internal peer reviewing, periodic reporting, preparation of financial statements, as well as risk management.

SEAFENNEL4MED Steering Committee

Chairman	UNIVPM	Lucia Aquilanti	e-mail: Laquilanti@univpm.it phone: +39 071 2204959 mobile: +39 3403300366
Project Coordinator			
WP1 Leader	UNIVPM	Deborah Pacetti	email: d.pacetti@univpm.it phone: +39 071 220 4685 mobile phone: 3483016689
WP2 Leader	INRGREF	Abdelhamid Khaldi	email: khaldin@yahoo.fr phone: +21671709033 mobile phone: +21697425066
WP3 Leader	IACKR	Branimir Uric	email: branimir.uric@krs.hr phone: +385 21 434 478 mobile phone: +385 98 896 362
WP4 Leader	CREA-AN	Valentina Melini	email: valentina.melini@crea.gov.it phone: +39 06 51494536 mobile phone:
WP5 Leader	UNIBRE	Christian Magne	email: christian.magne@univ-brest.fr mobile phone: +33 673 68 62 88 Telephone: +33 298 01 72 25
WP6 Leader	UNIEGE	Ozlem Uysal	email: ouysal4@gmail.com phone: +90 232 311 2972 mobile phone: +90 533 545 0223
WP7 Leader	UNIVPM	Daniele Duca	email: d.duca@univpm.it phone: +39 071 220 4631 mobile phone: +39 3337963762

9 h 45 – 10 h 15

- WP1 Leader (Lucia Aquilanti, UNIVPM)
Presentation of on-going activities and achievements related to project management and coordination (with the up-to-dated list of drafted/delivered deliverables)
- Open discussion about WP1 issues

Task 1.1. Organization of general Project meetings **ON-GOING**

Task 1.2. Project coordination, management, supervision, and quality control **ON-GOING**

Task 1.3. Communication with PRIMA call secretariat and the funding Agencies **ON-GOING**

Task 1.4 Preparation of mid-term and final reports **NOT STARTED**

Deliverables:

D1.1 General Project meeting n.1 (Kick off meeting) Report (month 2) **DELIVERED IN DUE TIME ON 17TH JUNE 2022**

D1.2 Quality Assurance Plan (month 3). **DELIVERED IN DUE TIME ON 16TH JUNE 2022**

D1.3 General Project meeting n.2 Report (month 13); **TO BE DELIVERED BY 30 JUNE 2023**

D1.4 1st year (progress) Report (month 13); **TO BE DELIVERED BY 30 JUNE 2023**

D1.5 General Project meeting n.3 Report (month 19);

D1.6 General Project meeting n.4 Report (month 25);

D1.7 2nd year (progress) Report (month 25);

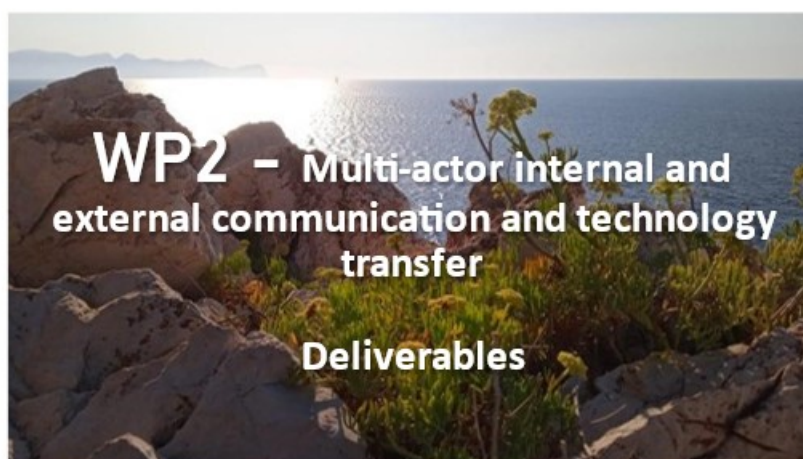
D1.8 General Project meeting n.5 Report (month 31);

D1.9 General Project meeting n.6 (Final workshop) (month 36);

D1.10 3rd year (final) Report (month 36)

1.6 ANNEX II - WP2 PRESENTATION

– Prof Deborah Pacetti (Vice Project Coordinator – WP2 Leader)



On-going activities and achievements related to communication and technology transfer (with the up-to-dated list of drafted/delivered deliverables)



Work package number	2	Lead beneficiary			Coordinator (UNIVPM)				
Work package title	<u>Multi-actor internal and external communication and technology transfer</u>								
Participant number	Coord.	P1	P2	P3	P4	P5	P6	P7	P8
Short name of participant	UNIVPM	CREA-AN	RINCI	UNIST	IACKR	UNIBRE	CIHEAM-MAICH	INRGREF	UNIEGE
Person months per participant	20	1	2	4	5	10	3	12	9
Start month	1			End month		36			

The objective of WP2 is **to ensure that SEAFENNEL4MED work represents a relevant response to the needs of Mediterranean small farms and industries and that the project's outputs are efficiently disseminated to be easily implemented and exploited.**



Specific tasks (T) of WP2

Task 2.1 Start-up activities **ON-GOING**

Task 2.2 Establishment of a stakeholder-platform and knowledge exchange network **ON-GOING**

Task 2.3 Installation and continuous up-date of SEAFENNEL4MED website **ON-GOING**

Task 2.4 Production of dissemination materials **ON-GOING**

Task 2.5 Documentation of scientific results **ON-GOING**

Task 2.6 Demonstration activities **NOT STARTED**



Deliverables:

D2.1 Project logo and communication templates (month 1); **DELIVERED IN DUE TIME ON**

D2.2 Public SEAFENNEL4MED website (month 2); **DELIVERED IN DUE TIME ON**

<https://seafennel4med.com/>



D2.3 SEAFENNEL4MED intranet (month 2); **DELIVERED IN DUE TIME ON**

Two systems were implemented: SharePoint as interoperable system and Google Drive as consultation system.

- **SharePoint** was used for editable files and work in progress documents where the PIs and their team members were given access upon request. This system is interoperable and controlled. The tracking of the modification and the simultaneous editing features of SharePoint allows a collaborative approach and easy exchange of feedbacks. The SharePoint site was organized in folders according to the WPs where the files were stored. After collaborative and online editing of the team members, the files were approved by the WP leader and stored definitively in google drive repository .
- **Google Drive** was used to create a shared repository where only people with access (PIs) can open with the link (https://drive.google.com/drive/folders/1zz194wTVswDVWx_5hF9mk-TJ01hxYBJx?usp=sharing). The shared folder was organized in subfolders named WP1, WP2, WP3, WP4, WP5, WP6, WP7, WP8 (Fig. 2) where the files were approved by each PIs and definitive different format of files were stored and accessible only for reading and downloading.



Deliverables

D2.4 Press release at Project launch for the wide public (month 3); **DELIVERED IN DUE TIME ON**

8 press releases from Italy

1 press release from CROATIA



No press releases from other country

D2.5 Establishment of a stakeholder platform for knowledge exchange network (month 6); **DELIVERED IN DUE TIME ON**

Multilanguage surveys were prepared for the stakeholders (6 languages ARAB, CROATIAN, ENGLISH, FRENCH, ITALIAN and TURKISH).



D2.6 SEAFENNEL4MED Data Management Plan (month 6); **DELIVERED IN DUE TIME ON**

data management plan was drafted and completed by Month 6, to manage data overall collected from both the stakeholders and the research and demonstration activities foreseen in WP3, 4, 5, 6, 7 and 8.

Deliverables



D2.7 Demonstration activity 1: sea fennel harvesting campaign involving students (month 20) TO BE DELIVERED BY 30 JANUARY 2024 (August/September 2023?)



Task 2.6 Demonstration activities (month 20–36); Partners involved: All. Communication is essential to promote the cultivation, exploitation but also use and consumption of sea fennel. Hence, promotional communication activities will accompany demonstration activities aimed at practically involving specific target stakeholders (customers, food business operators). **Hence, at least 2 demonstration activities will be held at P2: a first event, consisting of a sea fennel harvesting campaign at the sea fennel open fields, involving students of different ages and backgrounds, and a second event, organised at P2, consisting of the presentation of a sea fennel-based recipe book to customers and food business operators (chefs, gourmets, etc.).**



D2.8 Demonstration activity 2: presentation of sea fennel-based recipe book (month 34)

D2.9 Collection of 12 newsletters (month 36) 3/12, the 4th is planned before 30 May with some key results

D2.10 At least 2 articles in divulgative journals/magazines (months 36) 7/2 but only in Italian, ok ?

D2.11 At least 4 open access papers published in international peer-reviewed journals (months 36) 2/4

D2.12 At least 4 conference proceedings (months 36) 4-5 accepted

Please constantly update the Monitoring sheet – Seafennel4med publications

D2.13 At least 1 downloadable Project leaflet (month 36) Key results of scientific relevance and innovation potential will be summarised in leaflets (both in English and in the official languages of the Partners involved into the transnational Consortium) to present them to a wide public. You will be asked to translate the leaflet in our language

D2.14 At least 1 video on new sustainable organic sea fennel cropping systems and applications of the new crops for production of food/food ingredients/nutraceuticals (month 36)

D2.15 Press release at Final Workshop (month 36)

D2.16 Attendance at almost 1 event/exhibition aimed at promoting Mediterranean agri-food products where the supply and demand can encounter each other and the researchers (month 36) 2/1

Please constantly update the Monitoring sheet – Seafennel4med publications

Publications planned in the SEAFENNEL4MED PROPOSAL

	TARGET	INDICATOR	DELIVERABLE
PRESS RELEASES	N. Press release at Project launch for the wide public N. Press release at Project end	At least n.1 Press release At least n.1 Press release	D2.4 D2.15
PUBLICATION IN INTERNATIONAL PEER-REVIEWED JOURNALS	N. OPEN-ACCESS PAPERS published in international peer-reviewed journals	At least n.4 PUBLISHED PAPERS	D2.11
PUBLICATION IN DIVERGATIVE JOURNALS	N. PUBLISHED PAPERS in divergative journals/magazines	At least n.2 PUBLISHED PAPERS	D2.10
CONTRIBUTION AT NATIONAL/INTERNATIONAL CONFERENCES	N. abstracts published in conference proceedings (for attendance with oral presentation or poster)	At least n.4 ABSTRACTS published in conference proceedings	D2.12
DOWNLOADABLE PROJECT LEAFLET	N. downloadable Project leaflet	At least n.1 downloadable Project leaflet (Deliverable 2.13)	D2.13
VISITS		At least n.4 VISITS	D2.14

Work package	Task	I YEAR												II YEAR												III YEAR																							
		2022												2023												2024												2025											
		may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec				
WP1-Project coordination and overall management	1.1																																																
	1.2																																																
	1.3																																																
	1.4																																																
WP2-Multi-actor internal and external communication and technology transfer	2.1																																																
	2.2																																																
	2.3																																																
	2.4																																																
	2.5																																																
	2.6																																																
WP3-Characterisation of Mediterranean sea food types	3.1																																																
	3.2																																																
	3.3																																																
	3.4																																																
WP4-Sustainable production of organic sea food crops	4.1																																																
	4.2																																																
	4.3																																																
	4.4																																																
WP5-Validation of sustainable local parts for manufacturing of innovative sea food-based foods	5.1																																																
	5.2																																																
	5.3																																																
WP6-Validation of sustainable local parts for production of functional food	6.1																																																
	6.2																																																
	6.3																																																
WP7-Demonstration of socio-economic benefits of the proposed innovation	7.1																																																
	7.2																																																
	7.3																																																
WP8-Demonstration of environmental impacts and sustainability of the proposed innovation	8.1																																																
	8.2																																																
	8.3																																																

1.7 ANNEX III - WP3 PRESENTATION

– Dr Faten Mezni (Delegate Prof Abdelhamid Khaldi– WP3 Leader)



SEAFENNEL4MED

WP3: Characterization of Mediterranean sea fennel ecotypes

**2nd year general meeting
11-05-2023**

1



WP3 : Leader

Task 3.1. Sampling and morphological characterization of spontaneously growing sea fennel populations

Task 3.2. Chemical analysis of dried sea fennel aerial parts/seeds

Task 3.3. Molecular analysis of sea fennel aerial parts

Task 3.4. Elaboration of morphological, chemical, and genetic data for potential identification of different ecotypes

2

Task 3.1 Sampling and morphological characterization of spontaneously growing sea fennel populations

• Italian sites



August-October 2022

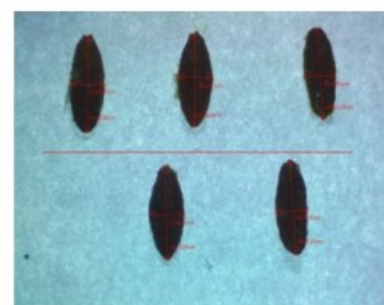
7 sites

reserve of Punta Rama near Palermo
"La Licciola" beach
Calalunga
Copanello
Porto Potenza Picena
Calafuria
Natural Park of Conero

3

Task 3.1 Sampling and morphological characterization of spontaneously growing sea fennel populations

The morphological characterization is in progress



4

Catalogued and stored seeds



Mature seeds sampled from Italian spontaneous populations were stored by the Anfi Adriatic Seed Bank (AASB) of the Orto Botanico Selva di Gallignano (UNIVPM, Ancona, Italy)

Seeds were archived for long-term storage in a freezer at -18°C



5

Task 3.1 Sampling and morphological characterization of spontaneously growing sea fennel populations

• Croatian sites



2022

10 sites

Krk

Senj

Pag

Šibenik

Split

Drašnice

Korčula

Pelješac

Neretva

Cavtat

6

Task 3.1 Sampling and morphological characterization of spontaneously growing sea fennel populations

The morphological characterization is in progress



7

Catalogued and stored seeds

Mature seeds were cleaned, weighed, and temporary stored at controlled temperature (16°C) until they are catalogued and stored at seed bank.



8

Task 3.1 Sampling and morphological characterization of spontaneously growing sea fennel populations

• French sites



Twenty sea fennel plants were sampled from Brittany shoreline at Porsévigné (Finistère, France) in October 2022. The morphological traits of their vegetative and reproductive organs were analysed

9

Task 3.1 Sampling and morphological characterization of spontaneously growing sea fennel populations

• Tunisian sites



September 2022

5 sites
Tabarka
Cap Negro
Bizerte
Haouaria
Monastir

10

Task 3.1 Sampling and morphological characterization of spontaneously growing sea fennel populations

The morphological characterization of the plants has been finalized
Seed characterization is in progress



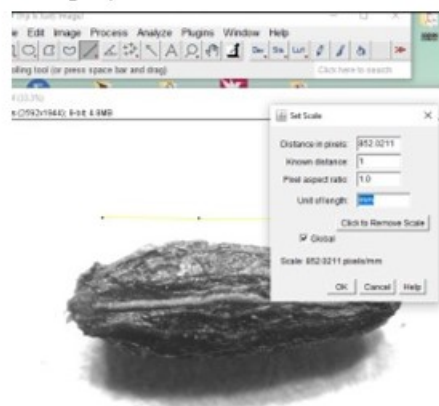
11

Task 3.1 Sampling and morphological characterization of spontaneously growing sea fennel populations

The morphological characterization of the plants has been finalized
Seed characterization is in progress (software: magic J)



poids des graines			
site	nb	Rp1	RP2
hawaria (100)	1	0.1601	0.1732
hawaria (100)	2	0.1601	0.1732
hawaria (100)	3	0.1796	0.1791
hawaria (100)	4	0.1643	0.1740
hawaria (100)	5	0.1671	0.1774
hawaria (100)	6	0.174	0.1742
hawaria (100)	7	0.2078	0.2062
hawaria (100)	8	0.1675	0.1775
hawaria (100)	9	0.1577	0.1672
hawaria (100)	10	0.205	0.1965
hawaria (100)	11	0.1473	0.1575
hawaria (100)	12	0.2075	0.2074
hawaria (100)	13	0.1951	0.1978
hawaria (100)	14	0.2274	0.2103
hawaria (100)	15	0.2013	0.1966
hawaria (100)	16	0.1554	0.1474
hawaria (100)	17	0.1576	0.1532
hawaria (100)	18	0.1658	0.1658
hawaria (100)	19	0.1658	0.1731
hawaria (100)	20	0.1854	0.188
Monastir (50)	1	0.0764	0.0843
Monastir (100)	2	0.1465	0.1462
Monastir (50)	3	0.0758	0.0769
Monastir (50)	4	0.1191	0.1444
Monastir (50)	5	0.0764	0.0704
Monastir (50)	6	0.0777	0.0794
Monastir (50)	7	0.0852	0.084
Monastir (50)	8	0.1032	0.0985



Catalogued and stored seeds



Seed collections were cleaned and placed in the Seed Bank drying room which is at 15°C and 15% relative humidity. Seeds were stored at -20°C

13

Task 3.1 Sampling and morphological characterization of spontaneously growing sea fennel populations

• Turkish sites



2022

4 sites

Çandarlı

Urla

Çeşme

Seferihisar

14

The morphological characterization of the plants and seeds has been finalized



15

The morphological characterization of the plants and seeds has been finalized

表 1 1990—2009 年中国人口自然增长率、出生率、死亡率、性别比和人口结构									
年份	出生率 (‰)	死亡率 (‰)	自然增长率 (‰)	出生率 (‰)	死亡率 (‰)	自然增长率 (‰)	出生率 (‰)	死亡率 (‰)	自然增长率 (‰)
1990	21.1	6.4	14.7	21.1	6.4	14.7	21.1	6.4	14.7
1991	20.9	6.3	14.6	20.9	6.3	14.6	20.9	6.3	14.6
1992	20.7	6.2	14.5	20.7	6.2	14.5	20.7	6.2	14.5
1993	20.5	6.1	14.4	20.5	6.1	14.4	20.5	6.1	14.4
1994	20.3	6.0	14.3	20.3	6.0	14.3	20.3	6.0	14.3
1995	20.1	5.9	14.2	20.1	5.9	14.2	20.1	5.9	14.2
1996	19.9	5.8	14.1	19.9	5.8	14.1	19.9	5.8	14.1
1997	19.7	5.7	14.0	19.7	5.7	14.0	19.7	5.7	14.0
1998	19.5	5.6	13.9	19.5	5.6	13.9	19.5	5.6	13.9
1999	19.3	5.5	13.8	19.3	5.5	13.8	19.3	5.5	13.8
2000	19.1	5.4	13.7	19.1	5.4	13.7	19.1	5.4	13.7
2001	18.9	5.3	13.6	18.9	5.3	13.6	18.9	5.3	13.6
2002	18.7	5.2	13.5	18.7	5.2	13.5	18.7	5.2	13.5
2003	18.5	5.1	13.4	18.5	5.1	13.4	18.5	5.1	13.4
2004	18.3	5.0	13.3	18.3	5.0	13.3	18.3	5.0	13.3
2005	18.1	4.9	13.2	18.1	4.9	13.2	18.1	4.9	13.2
2006	17.9	4.8	13.1	17.9	4.8	13.1	17.9	4.8	13.1
2007	17.7	4.7	13.0	17.7	4.7	13.0	17.7	4.7	13.0
2008	17.5	4.6	12.9	17.5	4.6	12.9	17.5	4.6	12.9
2009	17.3	4.5	12.8	17.3	4.5	12.8	17.3	4.5	12.8

[illegible]



Task 3.2. Chemical analysis of dried sea fennel aerial parts/seeds

• Italy



Chemical analysis	Progression
Carotenoids	Done for leaves and flowers
Tocopherols	Done for leaves and flowers
Vitamin C	In progress
Phenolic compounds	Done for leaves and flowers
Fatty acids	In progress
VOCs	Done for leaves and flowers

17



CAROTENOIDS LEAVES UPLC/PDA



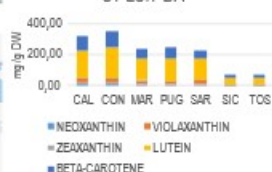
TOCOPHEROLS LEAVES UPLC/FLR



TOTAL POLYPHENOL CONTENT LEAVES



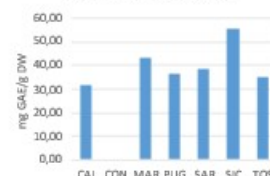
CAROTENOIDS FLOWERS UPLC/PDA



TOCOPHEROLS FLOWERS UPLC/FLR



TOTAL POLYPHENOL CONTENT FLOWERS



18

Task 3.2. Chemical analysis of dried sea fennel aerial parts/seeds

- Croatia

<u>Chemical analysis</u>	<u>Progression</u>
Carotenoids	In progress
Tocopherols	In progress
Vitamin C	Not performed
Phenolic compounds	Done for leaves
Fatty acids	Done for leaves
VOCs	Done for leaves and flowers

- Croatia

Phenolic profiles

[illegible]

Fatty acids

[illegible]

EO components

[illegible]



Task 3.2. Chemical analysis of dried sea fennel aerial parts/seeds

• France

Sea fennel plants were sampled from Brittany shoreline at Porsévigné (48.4315 N, -4.78564 W, Finistère, France). Aerial parts were air dried at 30°C before analyses. Thereafter, extractions and analyses were performed.

21



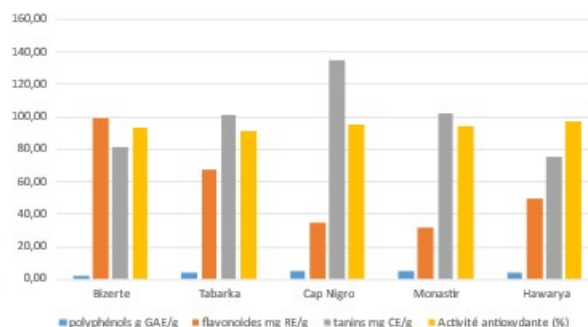
Task 3.2. Chemical analysis of dried sea fennel aerial parts/seeds

• Tunisia

<u>Chemical analysis</u>	<u>Progression</u>
Carotenoids	In progress
Tocopherols	In progress
Vitamin C	In progress
Phenolic compounds	Done for whole plant
Fatty acids	In progress
VOCs	Done for whole plant

22

• Tunisia



23

• Tunisia



	Monastir	Tabarka	Cap Negro	Hawarya	Bizerte
ALPHA-THIJENE	0,06	0,06	0	0	0,07
ALPHA-THIJENE	0,076667	0	0	0	0,086667
alpha pinene	0,17	0,15	0,59	0,01	0,2
SABINENE	0,25	0,15	0,56	0,01	0,263333
SABINENE	0,12	0,16	0	0	0,44
SABINENE	0,146667	0,116667	0	0	0,396667
beta pinene	0,02	0	0	0	0
beta pinene	0,02	0	0	0	0
beta myrcene	0,1	0,15	0	0	0,25
beta myrcene	0,11	0,116667	0	0	0,193333
ALPHA-PHELLANDRENE	0	0	0	0	0
ALPHA-PHELLANDRENE	0	0	0	0	0
alpha terpinene	0,1	0,06	0	0	0
alpha terpinene	0,08	0,06	0	0	0
cymol	6,69	4,47	7	0,43	10
cymol	6,356667	4,546667	8,173333	0,483333	9,473333
BETA-PHELLADRENE	0,1	0,29	0	0,02	5,14
BETA-PHELLADRENE	0,13	0,273333	0	0,053333	3,896667
GAMMA-TERPINENE	48,68	57,19	64,04	4,85	52,65
GAMMA-TERPINENE	53,20667	53,67	62,74667	3,963333	57,25
p-Mentha-1(8)-diene	0,01	0	0	0	0,4
p-Mentha-1(8)-diene	0,01	0	0	0	0,216667
p-Menth-1-en-4-ol	0,1	0,13	0	0	0,09
p-Menth-1-en-4-ol	0,096667	0,136667	0	0	0,09
Thymol methyl ether	0,14	0,25	0,32	0,04	0,34
Thymol methyl ether	0,153333	0,2	0,32	0,043333	0,253333
Anisole	30,63	29,26	28,39	7,47	30,58
Anisole	29,19667	31,42333	28,41333	5,986667	27,63333
5-ISOPROPYL-2-METHYLANISOLE	0,06	0,05	0	0	0,07
5-ISOPROPYL-2-METHYLANISOLE	0,06	0,05	0	0	0,08
BETA-SESQUIPHELLANDRENE	0,01	0	0	0,07	0
BETA-SESQUIPHELLANDRENE	0,013333	0	0	0,076667	0
TRANS-ISODILLAPIOLE	13,03	7,98	0	87,1	0,47
TRANS-ISODILLAPIOLE	10,16333	9,306667	0	89,39667	0,346667



Task 3.2. Chemical analysis of dried sea fennel aerial parts/seeds

• Turkey

Chemical analysis	Progression
Carotenoids	In progress
Tocopherols	
Vitamin C	
Phenolic compounds	
Fatty acids	
VOCs	

25



Task 3.3. Molecular analysis of sea fennel aerial parts

• Italy

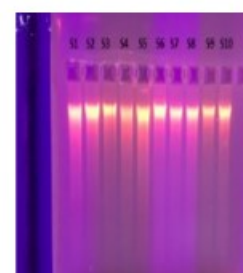


DNA in PCR grade water

Table 3. Concentration of extracted DNA and cottonseed oil (g/g)

Sample	Sample	Concentration	Concentration	Concentration	Concentration
PR1	PR1	1.0	1.0	1.0	1.0
PR2	PR2	1.0	1.0	1.0	1.0
PR3	PR3	1.0	1.0	1.0	1.0
PR4	PR4	1.0	1.0	1.0	1.0
PR5	PR5	1.0	1.0	1.0	1.0
PR6	PR6	1.0	1.0	1.0	1.0
PR7	PR7	1.0	1.0	1.0	1.0
PR8	PR8	1.0	1.0	1.0	1.0
PR9	PR9	1.0	1.0	1.0	1.0
PR10	PR10	1.0	1.0	1.0	1.0
PR11	PR11	1.0	1.0	1.0	1.0
PR12	PR12	1.0	1.0	1.0	1.0
PR13	PR13	1.0	1.0	1.0	1.0
PR14	PR14	1.0	1.0	1.0	1.0
PR15	PR15	1.0	1.0	1.0	1.0
PR16	PR16	1.0	1.0	1.0	1.0
PR17	PR17	1.0	1.0	1.0	1.0
PR18	PR18	1.0	1.0	1.0	1.0
PR19	PR19	1.0	1.0	1.0	1.0
PR20	PR20	1.0	1.0	1.0	1.0
PR21	PR21	1.0	1.0	1.0	1.0
PR22	PR22	1.0	1.0	1.0	1.0
PR23	PR23	1.0	1.0	1.0	1.0
PR24	PR24	1.0	1.0	1.0	1.0
PR25	PR25	1.0	1.0	1.0	1.0
PR26	PR26	1.0	1.0	1.0	1.0
PR27	PR27	1.0	1.0	1.0	1.0
PR28	PR28	1.0	1.0	1.0	1.0
PR29	PR29	1.0	1.0	1.0	1.0
PR30	PR30	1.0	1.0	1.0	1.0

Concentration of extracted DNA



electrophoresis on agarose gel (checking the integrity of DNA)

26



Task 3.3. Molecular analysis of sea fennel aerial parts

- Croatia



IN PROGRESS



27



Task 3.3. Molecular analysis of sea fennel aerial parts

- France

Sea fennel leaves sampled from Brittany shoreline at Porsévigné (Finistère, France) were stored at -20°C. The DNA will be extracted next month using DNeasy Plant Pro Kit by Qiagen for molecular analyses.



IN PROGRESS



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IN PROGRESS

29



Leaves were stored at -20 °C

30



Task 3.4.



Elaboration of morphological, chemical, and genetic data for potential identification of different ecotypes



Not started

31

	Italy	Croatia	France	Tunisia	Turkey
Task 3.1. Sampling			***		
Task 3.1. Morphological characterization					
Task 3.1. Seed storage			No data		No data
Task 3.2. Chemical characterization					
Task 3.3. Molecular characterization					
Task 3.4. Data elaboration					



	Achieved
	In progress
	Not started

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1.8 ANNEX IV - WP4 PRESENTATION

– Dr Branimir Urlic (WP4 Leader)

WP 4 - Sustainable production of organic sea fennel crop

Task 4.1 (R). Sustainable production of sea fennel crop in demo field - **ON GOING**

Task 4.2 (D). Sustainable production of sea fennel crop in open field (month 12 – 35) - **ON GOING**

Task 4.3. (D) Analysis of the new sea fennel crops (month 6 – 35) - **ON GOING**

Task 4.4. (D) Statistical analysis (month 18 – 35)

WP 4 - Sustainable production of organic sea fennel crop

Task 4.1 (R). Sustainable production of sea fennel crop in demo field . D4.1 Experimental plan design of cultivation trials - **done**

ITALY



CROATIA



TUNIS + TURKEY



TEST SITES CHOSEN AND PREPARED

CROATIA



TURKEY



TUNIS



ITALY



Seedlings production successful

Field transplanting – **IN PROGRESS**



D4.1 Experimental plan design of cultivation trials - **DONE**

D4.2 Fresh biomass (edible aerial parts) from the new organic sea fennel crops - **DELAYED**
(some data from Italy are available)



D4.3 By-products (old leaves and fibrous stems) from the new organic sea fennel crops - **DELAYED**

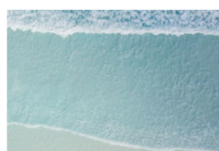


D4.4 Recommendations and guidelines on sustainable production of new organic sea fennel crops in the Mediterranean basin - **in one year 30.04. 2024**

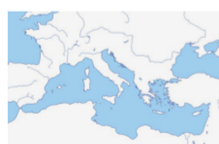
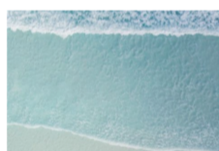
D4.5 Report with the elaborated data overall collected within WP4 - **at the project end**

1.9 ANNEX V - WP5 PRESENTATION

– Dr Valentina Melini (WP5 Leader)



Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



Task		Partners involved
Task 5.1	Laboratory-scale manufacturing of fermented shelf-stable sea-fennel preserves.	P1, P2, P7
Task 5.2	Laboratory-scale manufacturing of unfermented shelf-stable sea-fennel preserves.	P1, P4, P8
Task 5.3	Pilot-scale manufacturing of fermented and unfermented shelf-stable sea-fennel preserves.	P1, P2, P3

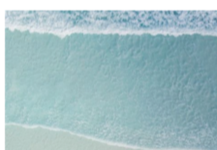
2nd General Meeting
11th May 2023

Work package	Task	I YEAR												II YEAR												III YEAR																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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WP5-Exploitation of sea fennel edible aerial parts for manufacturing of innovative	5.1	m	a	v	i	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j	u	n	j	u	l	a	u	s	e	p	o	c	t	n	o	v	d	e	c	a	n	f	e	b	m	a	i	a	p	m	a	j</



Task 5.1 Laboratory-scale manufacturing of fermented shelf-stable sea-fennel preserves

P1- UNIVPM



Prototypes:

1. Sea fennel-based Beer
2. Kimchi-like Preserve
3. Fermented Sea Fennel In Vinegar



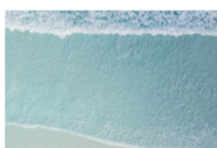
Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



Task 5.1 Laboratory-scale manufacturing of fermented shelf-stable sea-fennel preserves

P1- UNIVPM

1. Sea fennel-based BEER

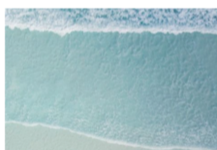


- Beer formulation ■
- Beer physico-chemical and technological parameters - Total soluble solids, total acidity, pH, alcoholic grade (% v/v), colour (EBC), and bitterness (IBUs) ■
- Beer phenolic content – TPC and Chlorogenic acid (UPLC-PAD) ■
- Beer volatile compounds – SPME and GC-MS analysis ■
- Sensorial analysis ■

Not started In progress Complete



Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



Task 5.1 Laboratory-scale manufacturing of fermented shelf-stable sea-fennel preserves

P1- UNIVPM

2. Kimchi-like preserve

Formulation

	% ingredient
Chinese cabbage	70,53%
Onion	4,37%
Garlic	0,50%
Ginger	0,50%
Sea fennel	7,05%
Red pepper	0,17%
Paprika	1,85%
Sugar	0,84%
Salt	0,76%
Water	13,43%

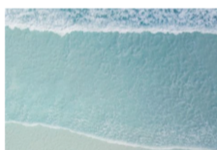
Starter culture – 4 LAB strains

- *Lactiplantibacillus plantarum* (strain PB257)
- *Pediococcus pentosaceus* (strain FF78)
- *Leuconostoc pseudomesenteroides* (strain PB288)
- *Weissella confusa* (strain PB 321)



Kimchi prototype prepared with sea fennel sprouts

Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



Task 5.1 Laboratory-scale manufacturing of fermented shelf-stable sea-fennel preserves

P1- UNIVPM

2. Kimchi-like preserve

Analyses

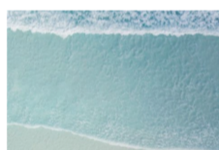
- Physico-chemical analysis– pH, TTA
- Microbial enumeration
- Isolation of LAB and DNA extraction
- Sensory analysis

Results



D5.1 At least 2 pilot scale prototypes of sea fennel-based fermented shelf stable preserves

Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



Task 5.1 Laboratory-scale manufacturing of fermented shelf-stable sea-fennel preserves

P1- UNIVPM

3. Fermented sea fennel sprouts in vinegar

Formulation ■

- Blanching sea fennel in brine inoculated with 4 LAB strains

Analyses ■

- Physico-chemical analysis – pH, TTA
- Microbial counting

Results ■

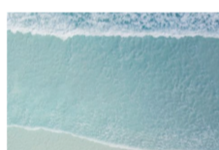
D5.1 At least 2 pilot scale prototypes of sea fennel-based fermented shelf stable preserves



Prototype of fermented sea fennel preserves



Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



Task 5.2 Laboratory-scale manufacturing of unfermented shelf-stable sea-fennel preserves

P1 - UNIVPM

- Shelf-stable pesto-like sauce

P7 - INRGREF

- Chili puree (harissa)
- Orange jam
- Snack

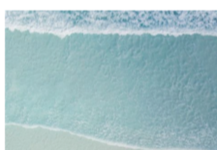
P4 - UNIST

- Dried spices formulated with blends of sea fennel and other Mediterranean aromatic herbs
- Dalmatian paté
- Pickled sea fennel

P8 - UNIEGE

- Snacks obtained by extrusion starting from i) doughs made with sea fennel and other ingredients and ii) stuffed with sea fennel cream
- Spiced noodles with sea fennel

Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



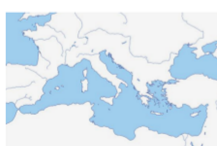
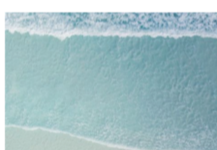
Task 5.2 Laboratory-scale manufacturing of unfermented shelf-stable sea-fennel preserves

P1 - UNIVPM

- Shelf-stable pesto-like sauce



Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



Task 5.2 Laboratory-scale manufacturing of unfermented shelf-stable sea-fennel preserves

P4 - UNIST

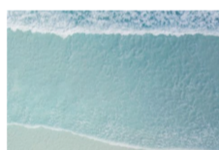
- Dried spices formulated with blends of sea fennel and other Mediterranean aromatic herbs
- Dalmatian paté
- Pickled sea fennel

Preparatory study on formulation



Selection of aromatic herbs and spices (rosemary, bay laurel, sage, basil, fennel) to be used in association with sea fennel based on their use in traditional dishes, chemical composition, antioxidant and organoleptic properties.

Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



Task 5.2 Laboratory-scale manufacturing of unfermented shelf-stable sea-fennel preserves

P4 - UNIST

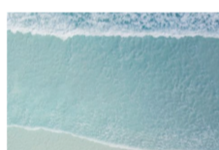
1. Dried spices formulated with blends of sea fennel and other Mediterranean aromatic herbs
2. Dalmatian paté
3. Pickled sea fennel



Preparatory study on formulation

Sea fennel in combination with **olives** or native/domestic Dalmatian variety of **onion** and various spices.

Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



Task 5.2 Laboratory-scale manufacturing of unfermented shelf-stable sea-fennel preserves

P4 - UNIST

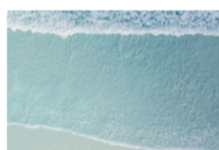
1. Dried spices formulated with blends of sea fennel and other Mediterranean aromatic herbs
2. Dalmatian paté
3. Pickled sea fennel



Preparatory study on formulation

Use of different vinegars (apple, grape, etc.) and their proportions, with/without blanching, etc. with respect to the chemical composition of the pickled sea fennel and its organoleptic properties.

Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



Task 5.2 Laboratory-scale manufacturing of unfermented shelf-stable sea-fennel preserves

P7 - INRGREF

- Chili puree (harissa)
- Orange jam
- Snack

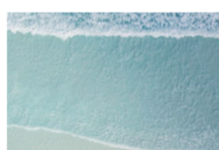


The formulation of harissa was made based on a popular traditional recipe. Main ingredients: dried pepper (50%), garlic (35%), mix (salt, coriander, caraway) (15%)



Analyses of stability and microbiological analyzes were carried out. A sensory analysis will be conducted with experienced and ordinary tasters.

Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



Task 5.2 Laboratory-scale manufacturing of unfermented shelf-stable sea-fennel preserves

P7 - INRGREF

- Chili puree (harissa)
- Orange jam
- Snack

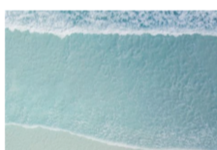


AIM: effect of sea fennel addition on stability and taste of orange jam



Analyses of stability and microbiological analyses were carried out (Deliverable 5.2). A sensory analysis is in progress with expert tasting panel.

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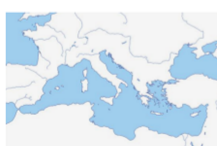
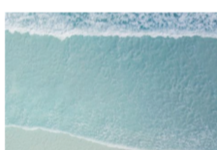
Task 5.2 Laboratory-scale manufacturing of unfermented shelf-stable sea-fennel preserves

P7 - INRGREF

- Chili puree (harissa)
- Orange jam
- Snack



Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



Task 5.2 Laboratory-scale manufacturing of unfermented shelf-stable sea-fennel preserves

P8 - UNIEGE

- Snacks obtained by extrusion starting from i) doughs made with sea fennel and other ingredients and ii) stuffed with sea fennel cream
- Spiced noodles with sea fennel

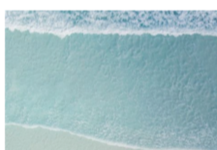


A study on the production and validation of a **hand-made pasta using sea fennel** supplied from a local producer has been carried out, as a **preparatory study** for task 5.2.

Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



Task 5.2 Laboratory-scale manufacturing of unfermented shelf-stable sea-fennel preserves



P8 - UNIEGE

- Snacks obtained by extrusion starting from i) doughs made with sea fennel and other ingredients and ii) stuffed with sea fennel cream
- Spiced noodles with sea fennel



Sea fennel hand-made pasta

Noodles were prepared by durum semolina added with 5% and 10% of sea fennel powder (dried at 45 °C for 48h)

Analyses: color parameters, cooking properties (optimum cooking time, water absorption, cooking loss, swelling index), and texture parameters were determined.

D5.2 At least 2 pilot scale prototypes of sea fennel-based unfermented shelf stable preserves



Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



Up-to-dated list of WP5 deliverables



D5.1 At least 2 pilot scale prototypes of sea fennel-based **fermented** shelf stable preserves

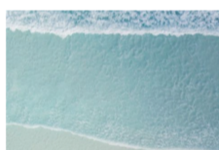


D5.2 At least 2 pilot scale prototypes of sea fennel-based **unfermented** shelf stable preserves



Due submission: month 24 (30.04.2024)

Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



To sum up

Work package	Task	I YEAR												II YEAR												III YEAR																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36												
		2022												2023												2024												2025											
WP5-Exploitation of sea fennel edible aerial parts for manufacturing of innovative	5.1	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr
	5.2																																																
	5.3																																																

8 months left

Not started

- Shelf-stable pesto-like sauce
- Dried spices formulated with blends of sea fennel
- Dalmatian paté
- Pickled sea fennel
- Snack
- Snacks obtained by extrusion
- Spiced noodles with sea fennel

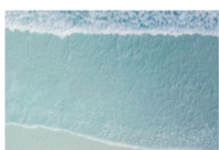
In progress

- Sea fennel-based beer
- Chili puree (harissa)
- Orange jam

Complete

- Kimchi-like preserve
- Fermented sea fennel sprouts in vinegar

Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities



Task	Partners involved
Task 5.3 Pilot-scale manufacturing of fermented and unfermented shelf-stable sea-fennel preserves.	P1, P2, P3

Work package	Task	I YEAR												II YEAR												III YEAR																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36												
WP5-Exploitation of sea fennel edible aerial parts for manufacturing of innovative sea fennel-based foods		2022												2023												2024												2025											
	5.1	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr
	5.2																																																
	5.3																																																

Start task 5.3

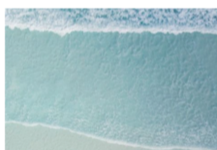
30.03.2025

D5.3 Recommendations and guidelines for manufacturing of new sea fennel-based fermented shelf-stable preserves at pilot scale.

D5.4 Recommendations and guidelines for manufacturing of new sea fennel-based unfermented shelf-stable preserves at pilot scale.

D5.5 Report with elaborated data overall collected within WP5.

Seafennel4med 2nd General meeting, 11 May 2023 – WP5 activities




WP5 – Exploitation of sea fennel edible aerial parts for manufacturing of innovative sea fennel-based foods

Open discussion

1.10 ANNEX VI - WP6 PRESENTATION

– Prof Christian Magné (WP6 Leader)



Work package number	6					Lead beneficiary			P6 (UNIBRE)		
Work package title	Valorisation of sea fennel crop by-products for production of functional food ingredients/nutraceuticals/soil amendments										
Participant number	P1	P2	P3	P4	P5	P6		P7	P8		
Short name of participant	UNIVPM	CREA-AN	RINCI	UNIST	IACR	UNIBRE		INRGREF	EGE		
Person months per participant	18	1	1	18	3	16		12	5.5		
Start month	12					35					
End month											

Objectives: The main objective of this WP is to valorise by-products (dissemed or discarded aerial parts, seeds, flower's autumn morphology) of the new crops for the formulation of functional food ingredients and nutraceuticals, given the acknowledged good high content of no edible aerial parts in extractable bio-active compounds (carotenoids, tocopherols, phenolic compounds, vitamin C).

Objectives: The main objective of this WP is to valorise by-products (damaged or discarded aerial parts, seeds, flowers, a stubble mowing) of the new crops for the formulation of functional food ingredients and nutraceuticals, given the acknowledged high content of no edible aerial parts in extractable bioactive compounds (carotenoids, tocopherols, phenolic compounds, vitamin C).

Description of work:

Task 6.1 (R&D) Preparation and analysis of extracts from sea fennel crop by-products (month 12 – 18). Partners involved P1, P2, P3, P4, P6, P7, P8. Refuse portions of the new sea fennel crops will be subjected to green extraction technologies (ultrasound, microwave) using food grade hydro-alcoholic (water/ethanol) solvent mixtures. The choice of these solvents fully complies with the European legislation (Directive 2008/32/EC), also considering the effectiveness towards the extraction of bioactive substances and the toxicity and environmental impact. The crude extracts (≥ 3) will be characterized by determining the bioactive compounds listed in T4.3, using advanced chromatographic techniques. The antioxidant activity of the extracts will be assessed by different *in vitro* methods such as ORAC, ABTS and DPPH, FRAP assays. Moreover, the antimicrobial activity of the crude extracts will be evaluated against key foodborne pathogens (*Escherichia coli*, *Staphylococcus aureus*, *Listeria monocytogenes*). Specific health-beneficial properties (antidiabetic and anti-inflammatory activity) of the extracts will be also investigated according to optimized protocols in use at P5).

Task 6.2 (R&D) Exploitation of the extracts as functional food ingredients and nutraceuticals (month 18 – 24). Partners involved P1, P3, P4, P6, P7, P8. The most promising extract in terms of antioxidant and/or antimicrobial activities will be tested as functional food ingredient to increase the shelf life and/or to mitigate the stabilization process of the new sea fennel-based preserves developed in WR6. In parallel, the most promising extract in terms of content of bioactive compounds and health-beneficial activities will be used as a source for nutraceutical preparations. To this end, different encapsulation, and delivery technologies (≥ 2) will be comparatively evaluated.

Task 6.3 (R&D) Composting of residual sea fennel biomass (month 24 – 35). Partners involved P1, P2, P3, P4, P5, P6, P7. Residual sea fennel biomass resulting from extraction of bioactive compounds will be assayed in laboratory-scale composting trials (≥ 2 biological replicates) to produce an effective soil amendment, to achieve the goal of zero waste farming system. Residual sea fennel biomass will be co-composted with wheat straw and/or other agro-industrial wastes. The evolution of pH, temperature, and phytotoxicity during co-composting will be monitored.

NEW Task 6.4 (R&D) (month 24 – 35). Partners involved P1, P2, P3, P4. Residual sea fennel biomass will be also assayed for extraction of essential oils which will be subsequently tested as functional food ingredients. Either laboratory-scale (P2, P4) and industrial-scale (P1 in collaboration with a local Italian company skilled in industrial steam distillation) extraction processes will be assayed for production of essential oils for an optimization of the yields. The produced essential oils will be exploited in laboratory-scale feasibility tests (P1) for the application as food ingredients in meat-based products, namely hamburgers and fermented salami. In case of need, prior to their application into food products, Eos will be subjected to deodorization.



Deliverables: D6.1 At least 1 crude extract with antioxidant, antimicrobial and/or health-beneficial activity (month 18); D6.2 Recommendations and guidelines for preparation of crude extracts with antioxidant, antimicrobial and/or health-beneficial activity from sea fennel (month 18); D6.3 At least 1 soil amendment produced by composting of sea fennel crop residual biomass (month 35); D6.4 Recommendations and guidelines for preparation of soil amendment by composting of sea fennel residual biomass (month 35); D6.5 Report with elaborated data overall collected within WP6 (month 35)

Work package	Task	I YEAR												II YEAR												III YEAR																	
		2022												2023												2024																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40		
		2022												2023												2024														2025			
WP1-Project coordination and overall management	1.1																																										
	1.2																																										
	1.3																																										
	1.4																																										
WP2-Field trials on sea fennel and evaluation of residual biomass and its biogas potential	2.1																																										
	2.2																																										
	2.3																																										
	2.4																																										
	2.5																																										
	2.6																																										
WP3-Characterization of Mediterranean sea fennel ecotypes	3.1																																										
	3.2																																										
	3.3																																										
	3.4																																										
WP4-Genetic diversity and production of organic sea fennel crop	4.1																																										
	4.2																																										
	4.3																																										
	4.4																																										
WP5-Production of sea fennel oil and its use in food and non-food products	5.1																																										
	5.2																																										
	5.3																																										
WP6-Production of sea fennel oil and its use in food and non-food products	6.1																																										
	6.2																																										
	6.3																																										
	6.4																																										
WP7-Characterization of sea fennel oil and its use in food and non-food products	7.1																																										
	7.2																																										
	7.3																																										
WP8-Characterization of sea fennel oil and its use in food and non-food products	8.1																																										
	8.2																																										
	8.3																																										



Composition of sea fennel

- Good source of **protein** (EAAs increase under optimal conditions)
- Fatty acids → **oleic acid** ~79% of TFA in seeds
- **Mineral** content (especially Na, Ca)
- High **dietary fiber** content
- **Vitamin** A, C, E
- **Phenols** (decrease if under optimal conditions)
 - **Chlorogenic acid** (described in leaves)
 - Ferulic acid
 - Epicatechin
 - Pyrocatechol
 - 4-hydroxybenzaldehyde
 - O-dihydroxyphenols (described in seeds)
 - Flavonoids (described in seeds)
- **Pigments**



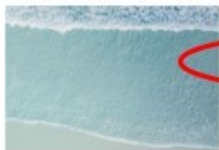
<https://www.sciencedirect.com/science/article/pii/S0098847214001221#bib1205>
https://www.natureinbottle.com/product/sea_fennel_essential_oil
<https://pubmed.ncbi.nlm.nih.gov/18880846/>
<https://www.sciencedirect.com/science/article/pii/S088915752100466X>
<https://link.springer.com/article/10.1007/s12374-009-9057-3>
<https://www.sciencedirect.com/science/article/pii/S0889157522005026>
<https://www.sciencedirect.com/science/article/pii/S0963996920306384>



Nutrient/bioactive compounds	Type of product	Application	Reference
Chitosan	Edible films	Fish burger (extended SL)	https://pubmed.ncbi.nlm.nih.gov/33187370/
Essential oil (Dillapiol, Myristicin, Oxygenated terpenes, Thymol methyl ether)	Nanoemulsion	Insecticide	https://www.sciencedirect.com/science/article/pii/S092666902030950X https://www.sciencedirect.com/science/article/pii/S0926669017306118 https://www.sciencedirect.com/science/article/pii/S0926669016303521
Essential oil + chlorophylls	Dried powder	Spice colorant	https://link.springer.com/article/10.1007/s10722-016-0472-2 https://www.sciencedirect.com/science/article/pii/S1878450X13000085
Essential oil	Essential Oil	Cosmetic Digestive	https://www.natureinbottle.com/product/sea-fennel-essential-oil
Essential oil	Microemulsion	Antimicrobial (against foodborne pathogens)	https://www.mdpi.com/2079-6382/11/4/447
Falcarindiol (a polyacetylene)	Chloroformic leaf extract	Food, cosmesis, preservative agent, medicine (antibiotic)	https://pubmed.ncbi.nlm.nih.gov/19922760/



Nutrient/bioactive compounds	Type of product	Application	Reference
Essential oil	Hydro-distilled essential oil	Fungicide	https://link.springer.com/article/10.1007/s10600-009-9242-0
Stem, leaves and flowers extract	Infusions and decoctions	Functional herbal beverages	https://pubmed.ncbi.nlm.nih.gov/28428087/
Stem, leaves, and flower essential oil	Hydro-distilled essential oil	Nutraceutical/medicinal (antioxidant, vasodilator, cholinesterase inhibitor)	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5052179/
Stem, leaves, and flower	Ethanol extract		
All bioactive compounds	Freeze-dried sea fennel plant	Enriched sunflower oil	https://pubmed.ncbi.nlm.nih.gov/35159589/
Leaf extract	Hydro-ethanolic extract	Antioxidant, antimicrobial, and antimutagenic activity	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8434227/
Plant extract	Ethyl acetate extract	Nutraceutical (inhibition of hepatocellular carcinoma)	https://pubmed.ncbi.nlm.nih.gov/35831770/
Plant extract	Aqueous and ethanolic extract	Dried liposome to design functional food	https://www.sciencedirect.com/science/article/pii/S0963996918308305



Task 6.2 (R&D) Exploitation of the extracts as functional food ingredients and nutraceuticals/soil amendments



P3 – RINCI

- providing to univpm of **residues of sea fennel crop** (e.g. non edible woody leaves – stems, autumn mowing) for development, production and validation of **new food ingredients**.



P2 – CREA-AN

- validation of the **new food ingredients developed by UNIVPM and/or extraction of essential oil from residues of sea fennel crop provided by Rinci**



P1 – UNIVPM

- production of extracts with polar bioactive compounds and analysis of their chemical, anti-oxidant and antimicrobial activities (the latter towards key foodborne pathogens: *Escherichia coli*, *Staphylococcus aureus*, *Listeria monocytogenes*) (**TEAM Prof PACETTI**)
- production and validation of **seasoning edible capsules** (from the extracts produced in t6.1 or essential oils produced in t6.3) → example balsamic modena vineyard (→ spherification process using sodium alginate) (**TEAM Prof PACETTI**)
- application of **essential oils** produced in t6.3 into the **production of fermented salami** (es. ciauscolo) to improve sensory traits/safety/functional properties (**TEAM Prof AQUILANTI**)
- application of **essential oils** produced in t6.3 into the **production of meat-based products** (es. hamburger) to improve sensory traits/safety/functional properties (example 3) (**TEAM Prof AQUILANTI**)





P4-UNIST

- extraction and analysis of essential oils (EOs) at laboratory scale;
- Addition of EOs to different vegetable oils in order to prevent their degradation (oxidation) and as flavour components.



P7- INRGREF

- extraction and analysis of essential oils (EOs);
- application of EOs as food ingredients to improve quality/shelf-life of???????



AS AGREED AT THE WP6 MEETING, BOTH THESE PARTENERS WILL COLLECT INDEPENDENTLY SEA FENNEL CROP RESIDUES (WITH NO CONTRIBUTION EXPECTED FROM RINCI)



Task 6.2 (R&D) Exploitation of the extracts as functional food ingredients/ nutraceuticals/soil amendments



LIST of examples of commercially available nutraceuticals

Example 1: sea fennel essential oil



LIST of examples of commercially available nutraceuticals

Example 2: sea fennel essential oil



€ 27,00
(0 Reviews)
Categoria: Uniani
Codice: G191
Prodotto: Finocchio Marino 200 cps
Peso netto: 65 g
Peso capsula: 250 mg
Area: Sistema Epatico
Forma: Capsule

INFORMAZIONI AL CONSUMATORE

FINOCCHIO MARINO
Integratore alimentare che può essere utile come coadiuvante la fisiologica funzionalità digestiva.

AVVERTENZE

Gli integratori alimentari non vanno intesi come sostituti di una dieta variata e di uno stile di vita attivo. Tenere lontano dalla portata dei bambini al di sotto dei tre anni. Non assumere in caso di ipersensibilità o allergie verso uno o più componenti.

INGREDIENTI

FINOCCHIO MARINO (per 1 cps): Finocchio marino - *Crithmum maritimum* L. (erba) polvere 250mg, gelatina naturale.

6 CAPSULE APPORTANO: 1.5g di *Crithmum maritimum* L.

MODO D'USO

Via orale: 2 cps per 3 volte die

INFORMAZIONI AGGIUNTIVE

Difficoltà digestive? Pancia gonfia?

Il **FINOCCHIO MARINO** è una pianta officinale commestibile ricca di vitamina C (per questo, nel passato, veniva conservato dai marinai, che lo trovavano lungo le coste). La pianta è ricca di oli essenziali, iodio, oligoelementi, beta carotene, proteine, vitamina C e sali minerali.

Da questi principi attivi derivano proprietà aromatiche, aperitive, carminative, digestive, diuretiche.



LIST of examples of commercially available nutraceuticals

Example 3: sea fennel essential oil



OLIO ESSENZIALE DI FINOCCHIO DI MARE Laboratoire Altho

★★★★★ 0 Recensioni

Scheda Riassuntiva

- Dimagrante e rassodante
- Agisce efficacemente contro la cellulite
- Proprietà antiossidanti
- Allontana i parassiti intestinali
- Utilizzato anche in cosmetici anti-età
- Olio essenziale puro al 100%



€33,90 €28.82

Questo prodotto vale 9 punti

Aggiungi al Carrello

Se ordini adesso la consegna del pacco è prevista per **domani**

- Assistenza clienti
- Buono di benvenuto
- Campioncini gratuiti
- Reso facile in 30 giorni

Scopri i 10 motivi



LIST of examples of commercially available nutraceuticals

Example 4: sea fennel essential oil

Terpenic Labs Finocchio Marino Bio 30ml

30 ml

#terpenic #piante officinali #oli essenziali

Spedizione in 24-72 ore



Invio gratis

201,33 €

Spedizione da Spagna Vedi dettagli
Solo 2 unità a questo prezzo

1

Aggiungi



LIST of examples of commercially available nutraceuticals

Example 5: SEA FENNEL SEEDS COATED WITH SUGAR



Finocchio Confettato 1kg

MINSAN 977551765
Zona Occhio
Produttore ERBAMEA Srl

INVIATA AD UN AMICO

Spedizione GRATUITA a partire da 38.00€

Service Client

Pagamenti Sicuri

Prezzo predefinito 40,00€

Sconto -53%

Prezzo speciale **23,03 €** IVA INCLUSA al 10%

Q.tà 1

Disponibilità: Immediata

Spedizione: Corriere Espresso

Aggiungi al Carrello

Aggiungi alla lista desideri

Richiedi informazioni sul Prodotto

ERBAMEA
Finocchio confettato

Descrizione

Il Finocchio è una pianta tipicamente mediterranea, conosciuta e apprezzata già nell'antica Roma per le sue proprietà aromatiche. Tutte le sue parti contengono infatti un olio essenziale dal profumo particolarmente gradevole e intenso. Erbamea propone dei frutti di Finocchio confettati, cioè ricoperti da un sottile strato di zucchero, per avvalersi con gusto delle loro proprietà carminative e utili per le funzioni digestive.



P3 – RINCI

- PROVIDING to P1-UNIVPM OF DRIED RESIDUES OF SEA FENNEL CROP (e.g. NON EDIBLE WOODY LEAVES – STEMS, autumn mowing) FOR development, production and validation of **nutraceuticals**.

P2 – CREA-AN

- Validation of the nutraceuticals developed by P1-UNIVPM and/or extraction of essential oil from residues of sea fennel crop provided by Rinci

P1 – UNIVPM

- Production of extracts with polar bioactive compounds and analysis for their chemical/antioxidant/antimicrobial traits
- Application of the extracts with polar bioactive compounds for the production of edible capsules (in gelatine)



P6 – UNIBRE

- analysis of beneficial effects of the watery extracts with polar bioactive compounds on the human health: antidiabetic and anti-inflammatory activity (UNIBRE is available for carrying out these analyses on the extracts produced by the different CONSORTIUM partners)

P7- INRGREF

- Use the by-products of sea fennel in animal feed formulate (concentrates or vegetable flours) based on sea fennel or mixed with other products. We propose to test their effectiveness on average daily gain (for the ruminants).
- Use aqueous extracts for animal nutrition and try to find out if it has an effect on the quality of meat.
- Test the antioxidant, anti-diabetic, antifungal and insecticidal effects of aqueous extracts and essential oils of sea fennel by-products

P8 – UNIEGE

- encapsulation of standardized crude extract with polar bioactive compounds (one extract obtained at optimum extraction conditions) in micro- and nano-carriers and evaluation of stability (UV, heat)
- evaluation of health-beneficial traits of a standardized crude extract with polar bioactive compounds (one extract obtained at optimum extraction conditions): anti-diabetic effects using enzyme (alfa-glucosidase) inhibition assays
- preparation of mucoadhesive oral films (oral strips) at lab scale for the buccal delivery of polar bioactive compounds in standardized crude extract (only for one extract obtained at optimum extraction conditions)
- evaluation of the synergistic effects of a standardized crude extract with polar bioactive compounds (one extract obtained at optimum extraction conditions) with selected bio-enhancers

If time permits and if we can get extra research funds P8-UNIEGE is available for the analysis of alfa glucosidase enzyme inhibition assays, and Hen's Egg Test – Chorioallantoic Membrane (HET-CAM) experiments for the determination of blood glucose decreasing properties of the standardized extracts for antidiabetic activity evaluation



AS AGREED AT THE WP6 MEETING, all these PARTENERS WILL COLLECT INDEPENDENTLY SEA FENNEL CROP RESIDUES (WITH NO CONTRIBUTION EXPECTED FROM RINCI)



Task 6.2 (R&D) Exploitation of the extracts as functional food ingredients/ nutraceuticals/soil amendments



P5-IACKR

- Laboratory-scale composting trials with the residues of sea fennel biomass after extraction of polar/apolar bioactive compounds



IACKR WILL RECEIVE RESIDUAL SEA FENNEL BIOMASS (RESULTING FROM THE EXTRACTION PROCESSES) BY P1, P2, P4, P7, P8



Further insights from the WP6 meeting held on 20.10.22

- Each of the following PARTNERS involved in this WP will collect its own residues from sea fennel crops: P4, P6, P7, P8 (P1-UNIVPM will obtain these residues from P3-RINCI)
- FOR HEALTH BENEFICIAL TRAITS OF SEA FENNEL P6-UNIBRE (Christian Magné christian.magne@univ-brest.fr) and P8-UNIEGE (Oguz Bayraktar oguzbayraktar70@gmail.com) will keep in contact and agree on how distribute this activities, based on their specific expertises.

P4-UNIBRE is available for the analysis of 100 g of POWDERED SEA FENNEL SENT BY P4, P7, P8 for the following traits:.....



1.11 ANNEX VII - WP7 PRESENTATION

– Prof Ozlem Ouyal (WP7 Leader)



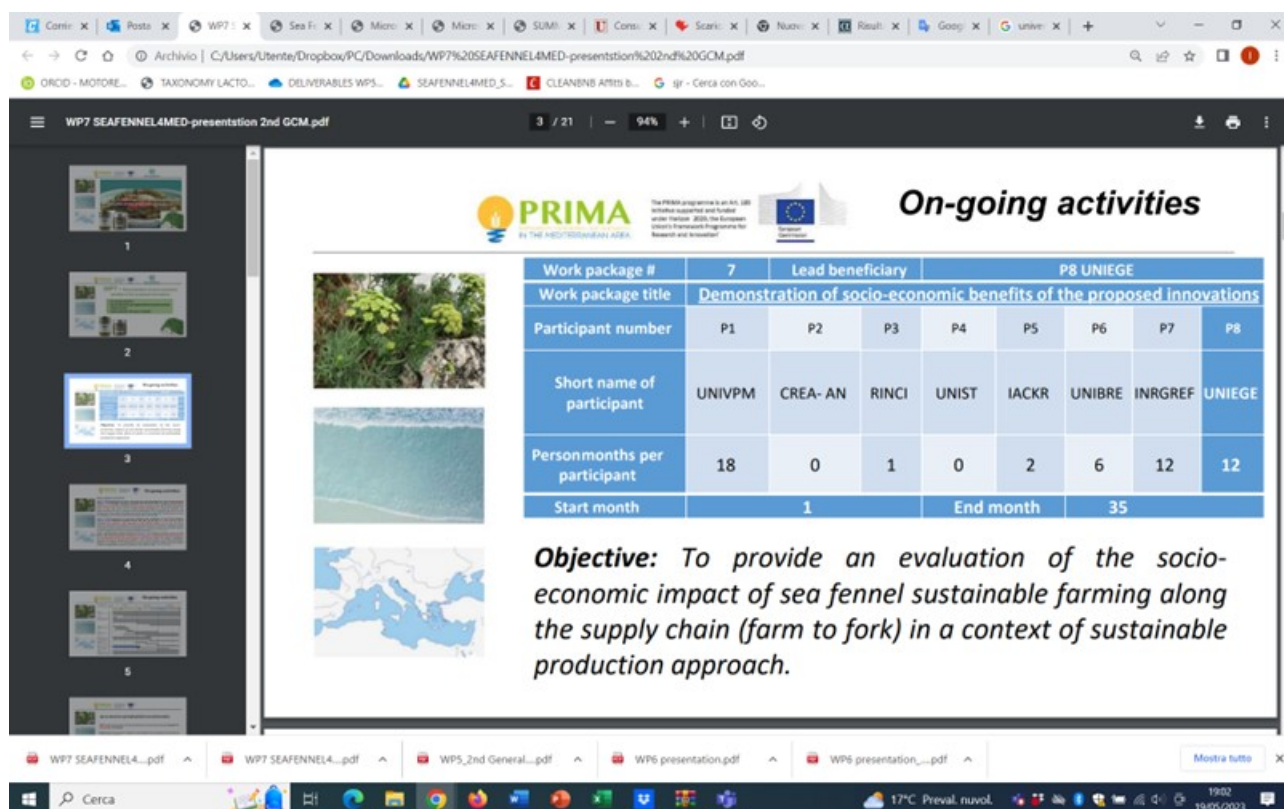
The screenshot shows a PDF presentation slide titled "WP7 - Demonstration of socio-economic benefits of the proposed innovations". The slide features the PRIMA and SEA FENNEL logos at the top. The main content includes a large image of a dish with seaweed, two jars of seaweed products, and a map of the Mediterranean. A text box on the right states: "2ND GENERAL MEETING of the SEAFENNEL4MED PROJECT 11 MAY 2023, On-Line Meeting". The slide is part of a presentation titled "WP7 SEAFENNEL4MED-presentation 2nd GCM.pdf".



The screenshot shows a PDF presentation slide titled "WP7 - Demonstration of socio-economic benefits of the proposed innovations". The slide features the PRIMA and SEA FENNEL logos at the top. The main content includes a large image of a dish with seaweed, two jars of seaweed products, and a map of the Mediterranean. A text box on the right lists the following activities:

- On-going activities
- Up-to-dated list of drafted/delivered deliverables
- Achievements
- Action plan for the next 6 months

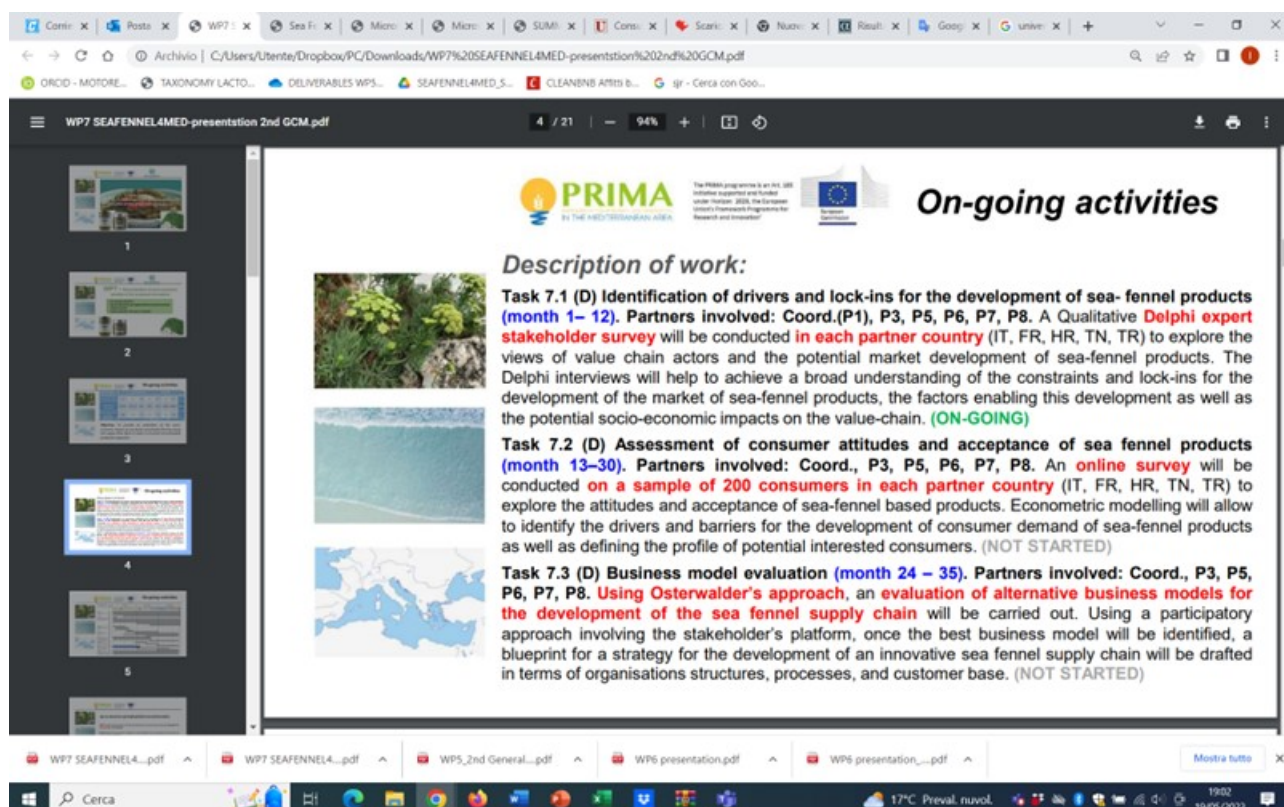
The slide is part of a presentation titled "WP7 SEAFENNEL4MED-presentation 2nd GCM.pdf".



On-going activities

Work package #	7	Lead beneficiary							P8 UNIEGE
Work package title	Demonstration of socio-economic benefits of the proposed innovations								
Participant number	P1	P2	P3	P4	P5	P6	P7	P8	
Short name of participant	UNIVPM	CREA- AN	RINCI	UNIST	IACKR	UNIBRE	INRGREF	UNIEGE	
Personmonths per participant	18	0	1	0	2	6	12	12	
Start month	1				End month				35

Objective: To provide an evaluation of the socio-economic impact of sea fennel sustainable farming along the supply chain (farm to fork) in a context of sustainable production approach.

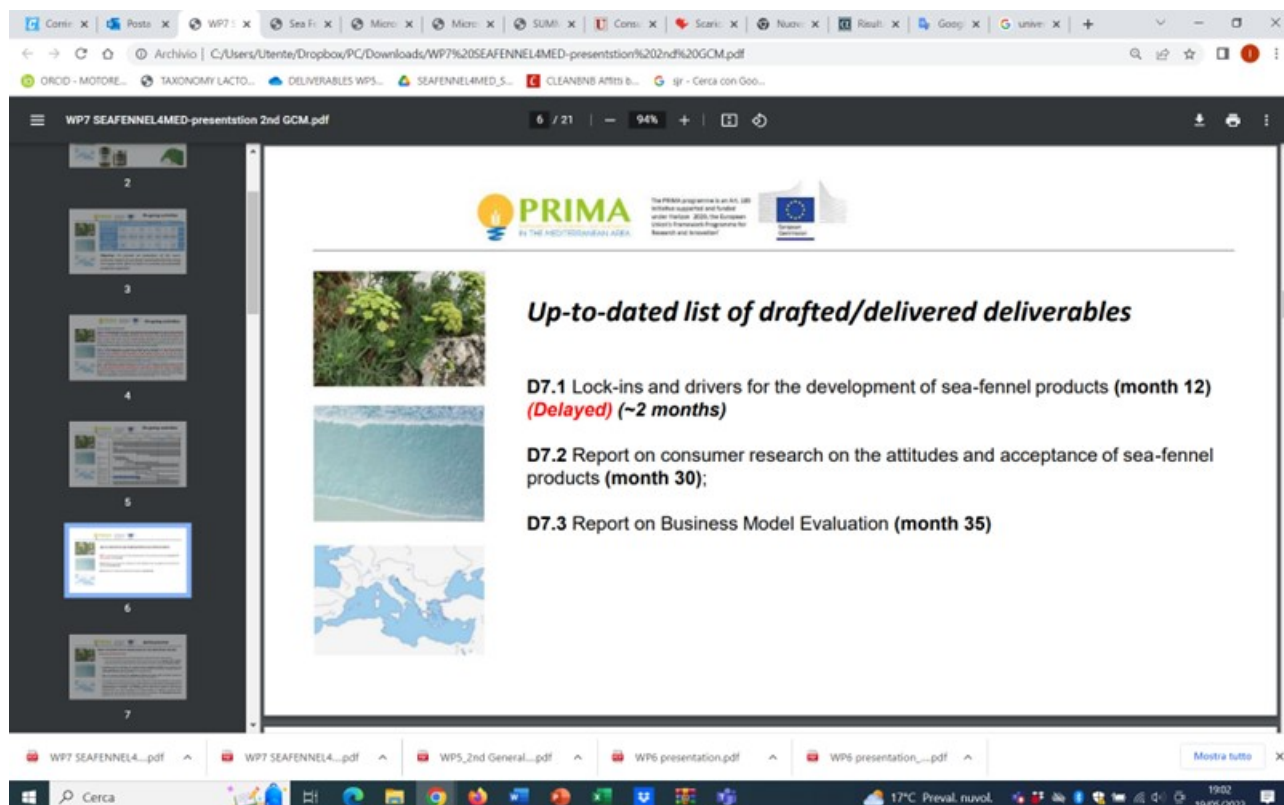


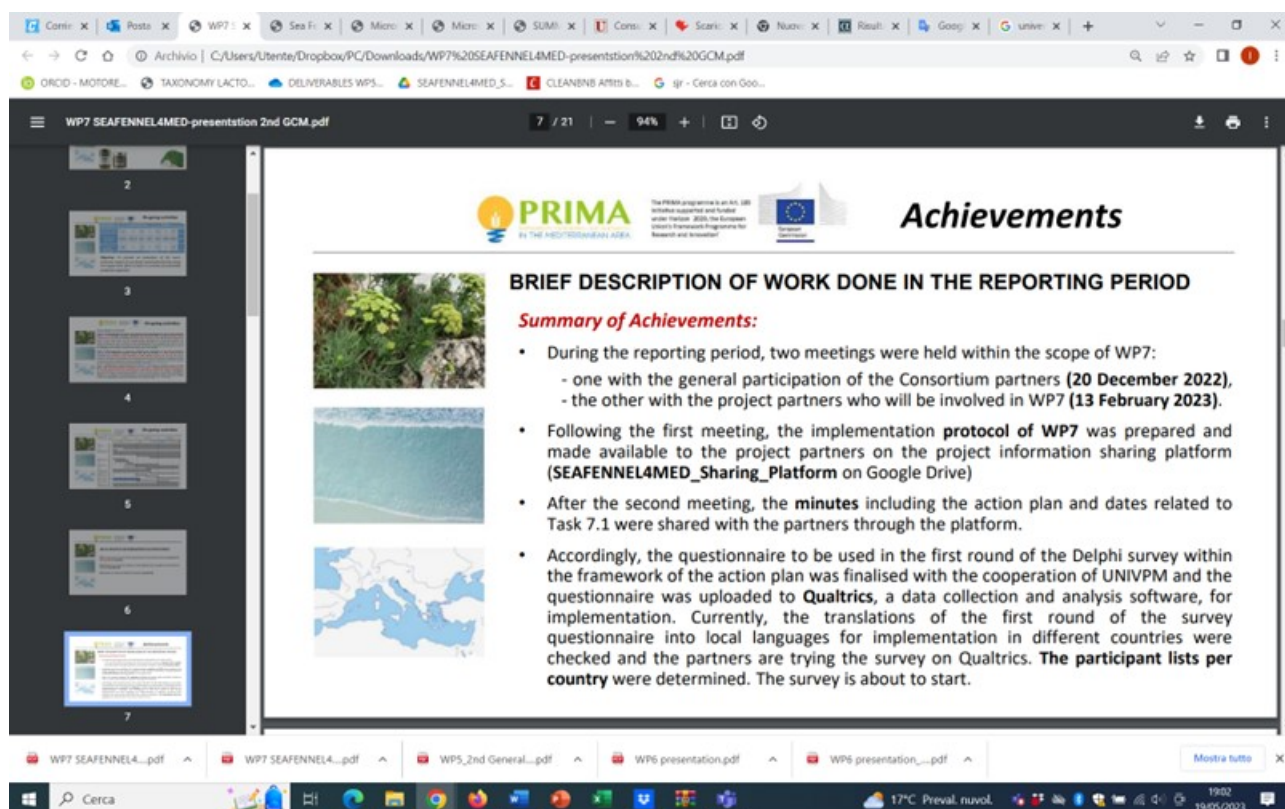
Description of work:

Task 7.1 (D) Identification of drivers and lock-ins for the development of sea-fennel products (month 1– 12). Partners involved: Coord.(P1), P3, P5, P6, P7, P8. A Qualitative **Delphi expert stakeholder survey** will be conducted **in each partner country** (IT, FR, HR, TN, TR) to explore the views of value chain actors and the potential market development of sea-fennel products. The Delphi interviews will help to achieve a broad understanding of the constraints and lock-ins for the development of the market of sea-fennel products, the factors enabling this development as well as the potential socio-economic impacts on the value-chain. **(ON-GOING)**

Task 7.2 (D) Assessment of consumer attitudes and acceptance of sea fennel products (month 13–30). Partners involved: Coord., P3, P5, P6, P7, P8. An **online survey** will be conducted **on a sample of 200 consumers in each partner country** (IT, FR, HR, TN, TR) to explore the attitudes and acceptance of sea-fennel based products. Econometric modelling will allow to identify the drivers and barriers for the development of consumer demand of sea-fennel products as well as defining the profile of potential interested consumers. **(NOT STARTED)**

Task 7.3 (D) Business model evaluation (month 24 – 35). Partners involved: Coord., P3, P5, P6, P7, P8. Using **Osterwalder's approach**, an **evaluation of alternative business models for the development of the sea fennel supply chain** will be carried out. Using a participatory approach involving the stakeholder's platform, once the best business model will be identified, a blueprint for a strategy for the development of an innovative sea fennel supply chain will be drafted in terms of organisations structures, processes, and customer base. **(NOT STARTED)**





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Achievements

BRIEF DESCRIPTION OF WORK DONE IN THE REPORTING PERIOD

Summary of Achievements:

- During the reporting period, two meetings were held within the scope of WP7:
 - one with the general participation of the Consortium partners (**20 December 2022**),
 - the other with the project partners who will be involved in WP7 (**13 February 2023**).
- Following the first meeting, the implementation **protocol of WP7** was prepared and made available to the project partners on the project information sharing platform (**SEAFENNEL4MED_Sharing_Platform** on Google Drive)
- After the second meeting, the **minutes** including the action plan and dates related to Task 7.1 were shared with the partners through the platform.
- Accordingly, the questionnaire to be used in the first round of the Delphi survey within the framework of the action plan was finalised with the cooperation of UNIVPM and the questionnaire was uploaded to **Qualtrics**, a data collection and analysis software, for implementation. Currently, the translations of the first round of the survey questionnaire into local languages for implementation in different countries were checked and the partners are trying the survey on Qualtrics. **The participant lists per country were determined.** The survey is about to start.



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Task 7.1: DESCRIPTION OF WORK DONE IN THE REPORTING PERIOD

1. Background and Objective

- Given that the overall objective of the SeaFennel4Med project is to put forward the sustainable organic sea fennel based cropping systems, it has been crucial to include an evaluation of the socio-economic perspective in order to discover the basic components to be included and to be avoided in such a system.
- Therefore, the objective of the WP7 is to provide an evaluation of the socio-economic impact of sea fennel sustainable farming along the supply chain (farm to fork) in a context of sustainable production approach.
- As a first step to attain this objective, qualitative Delphi expert stakeholder surveys are currently being initiated in all the partner countries to explore the views of value chain actors on the potential market development of sea-fennel products.
- D7.1 will be the report of the overall results of the Delphi surveys. It will cover a general evaluation of the lock-ins and drivers for the development of sea-fennel products in the Mediterranean. The report will also put forward a basis for the next two tasks of the WP7, namely the consumer survey and the Business model evaluation study.

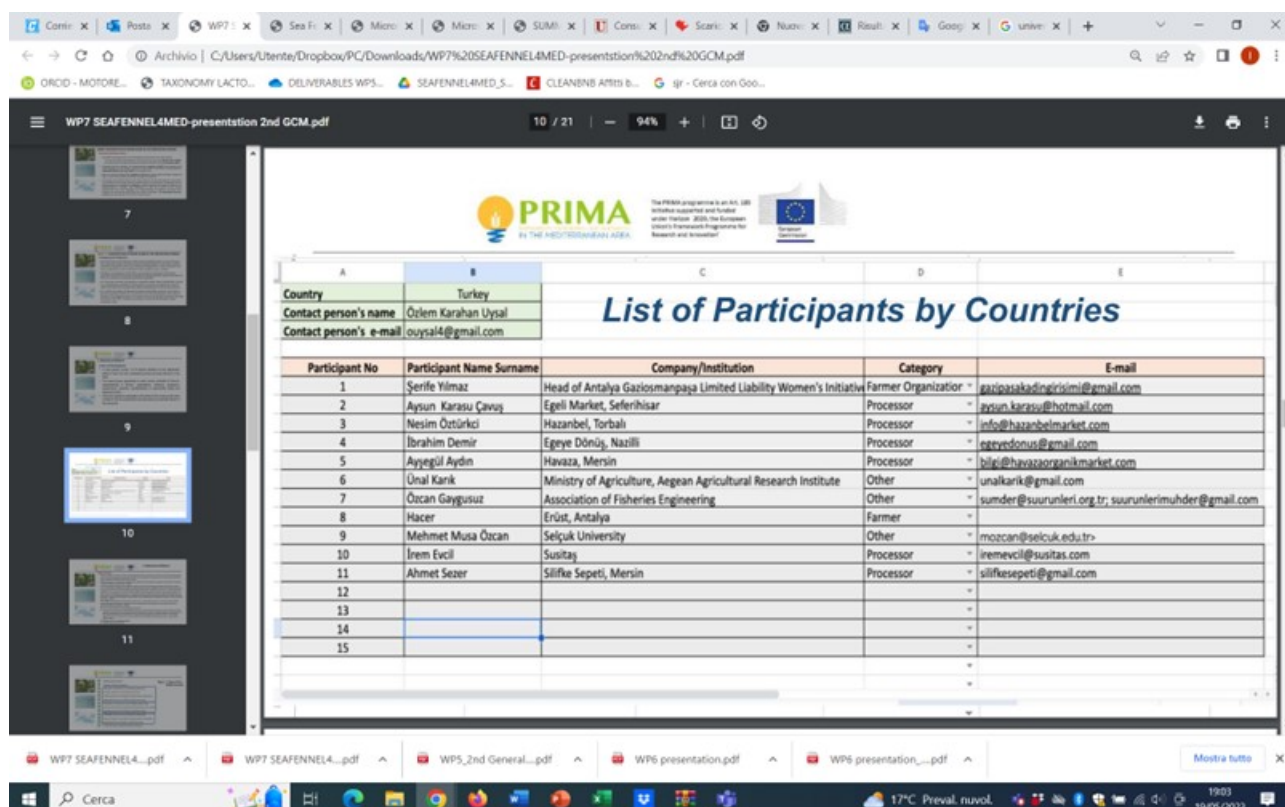


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2. Material and Method

Lists of Participants

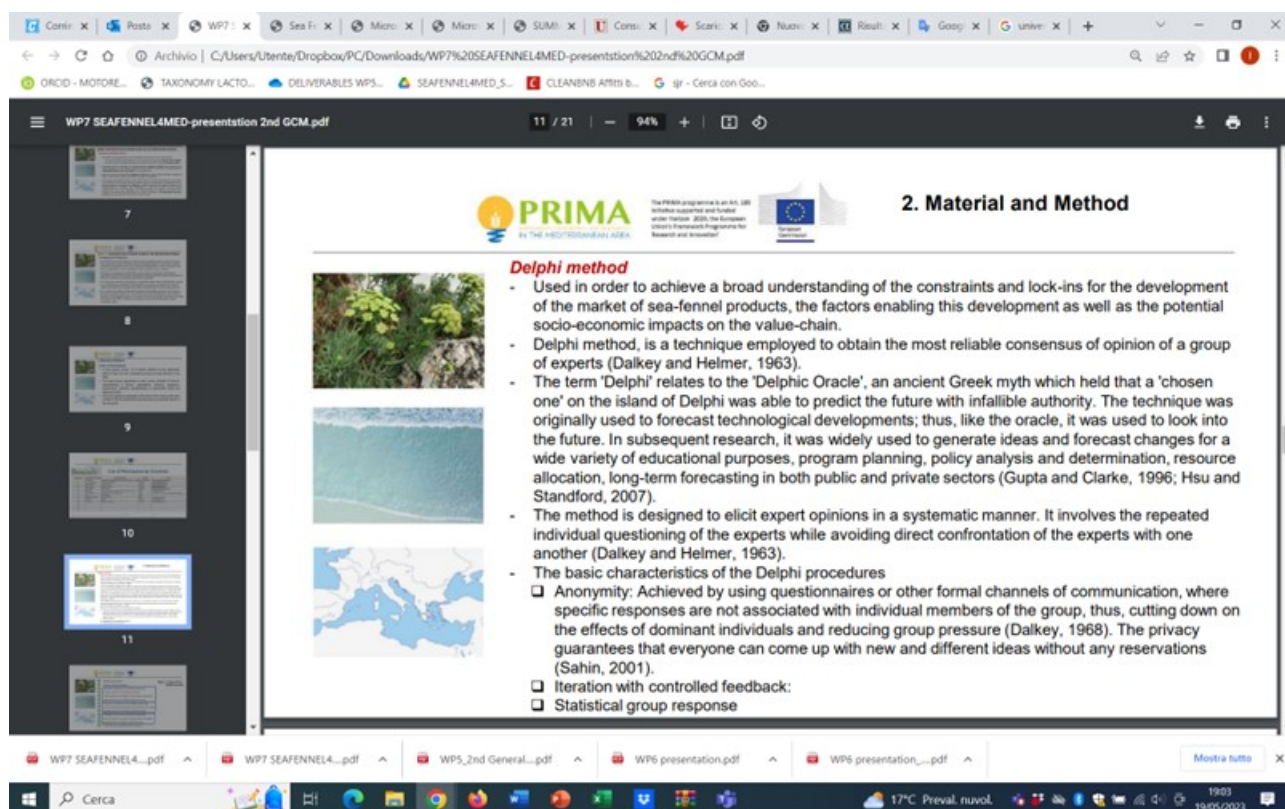
- In each partner country, 10-15 experts identified via the stakeholder platform (Task 2.2) were contacted by phone and were informed on the study.
- The expert groups approached in each country consisted of farmers, representatives of farmers' organizations, collectors, processors, academicians, exporters, representatives of supermarket (retail) and restaurant chains.
- Those who agreed to participate in the series of the survey rounds were included in the list of participants and were sent an e-mail with the link of the survey site.



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List of Participants by Countries

Participant No	Participant Name Surname	Company/Institution	Category	E-mail
1	Serife Yılmaz	Head of Antalya Gaziosmanpaşa Limited Liability Women's Initiative	Farmer Organization	gazipasaadingirisimi@gmail.com
2	Aysun Karasu Çavuş	Egeli Market, Seferihisar	Processor	aysun.karasu@hotmail.com
3	Nesim Öztürk	Hazanbel, Torbalı	Processor	info@hazanbelmarket.com
4	İbrahim Demir	Egeye Dönüş, Nazilli	Processor	egeyedonus@gmail.com
5	Ayşegül Aydın	Havaza, Mersin	Processor	hligi@havazaorganikmarket.com
6	Ünal Karık	Ministry of Agriculture, Aegean Agricultural Research Institute	Other	unalkarik@gmail.com
7	Özcan Gaygusuz	Association of Fisheries Engineering	Other	sunder@suurunleri.org.tr, suurunlerimuhder@gmail.com
8	Hacer	Erişt, Antalya	Farmer	
9	Mehmet Musa Özcan	Seçuk University	Other	mocan@sechuk.edu.tr
10	İrem Evci	Susitas	Processor	iremevcil@susitas.com
11	Ahmet Sezer	Silifke Sepeti, Mersin	Processor	silifkesepti@gmail.com
12				
13				
14				
15				



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2. Material and Method

Delphi method

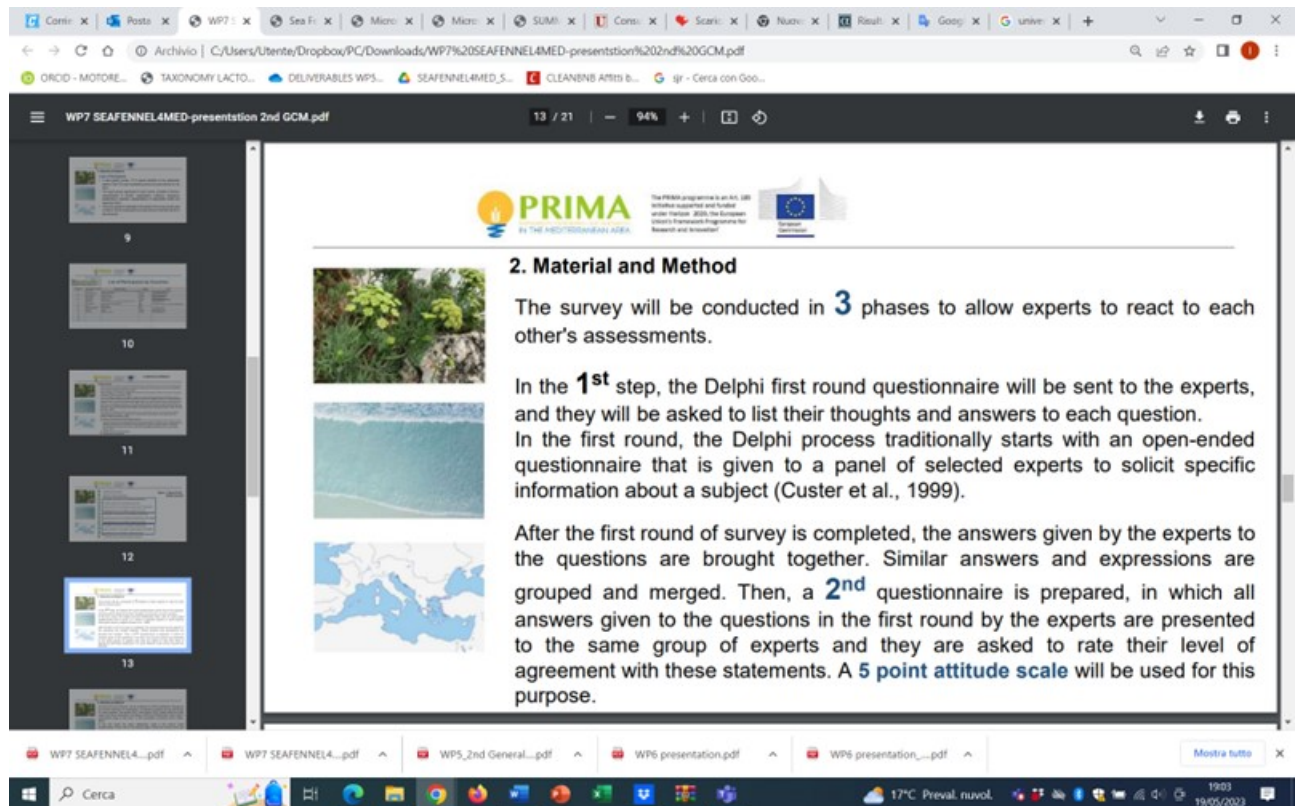
- Used in order to achieve a broad understanding of the constraints and lock-ins for the development of the market of sea-fennel products, the factors enabling this development as well as the potential socio-economic impacts on the value-chain.
- Delphi method, is a technique employed to obtain the most reliable consensus of opinion of a group of experts (Dalkey and Helmer, 1963).
- The term 'Delphi' relates to the 'Delphic Oracle', an ancient Greek myth which held that a 'chosen one' on the island of Delphi was able to predict the future with infallible authority. The technique was originally used to forecast technological developments; thus, like the oracle, it was used to look into the future. In subsequent research, it was widely used to generate ideas and forecast changes for a wide variety of educational purposes, program planning, policy analysis and determination, resource allocation, long-term forecasting in both public and private sectors (Gupta and Clarke, 1996; Hsu and Standford, 2007).
- The method is designed to elicit expert opinions in a systematic manner. It involves the repeated individual questioning of the experts while avoiding direct confrontation of the experts with one another (Dalkey and Helmer, 1963).
- The basic characteristics of the Delphi procedures
 - Anonymity: Achieved by using questionnaires or other formal channels of communication, where specific responses are not associated with individual members of the group, thus, cutting down on the effects of dominant individuals and reducing group pressure (Dalkey, 1968). The privacy guarantees that everyone can come up with new and different ideas without any reservations (Sahin, 2001).
 - Iteration with controlled feedback:
 - Statistical group response



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Figure 1. Steps of the Delphi process

- Identifying the problem
- Selection of the expert group
- Preparation of the first-round Delphi questionnaire
- Testing of the first-round questionnaire form
- Sending the first-round Delphi questionnaire to the experts
- Analyzing the first-round Delphi questionnaire data
- Preparation of the second round Delphi questionnaire
- Sending the second-round Delphi questionnaire to the experts
- Analyzing second-round Delphi questionnaire data
- Preparation of the third round Delphi questionnaire
- Sending the third round Delphi questionnaire to the experts
- Analyzing third round Delphi questionnaire data
- Conclusion of the process/consensus reached



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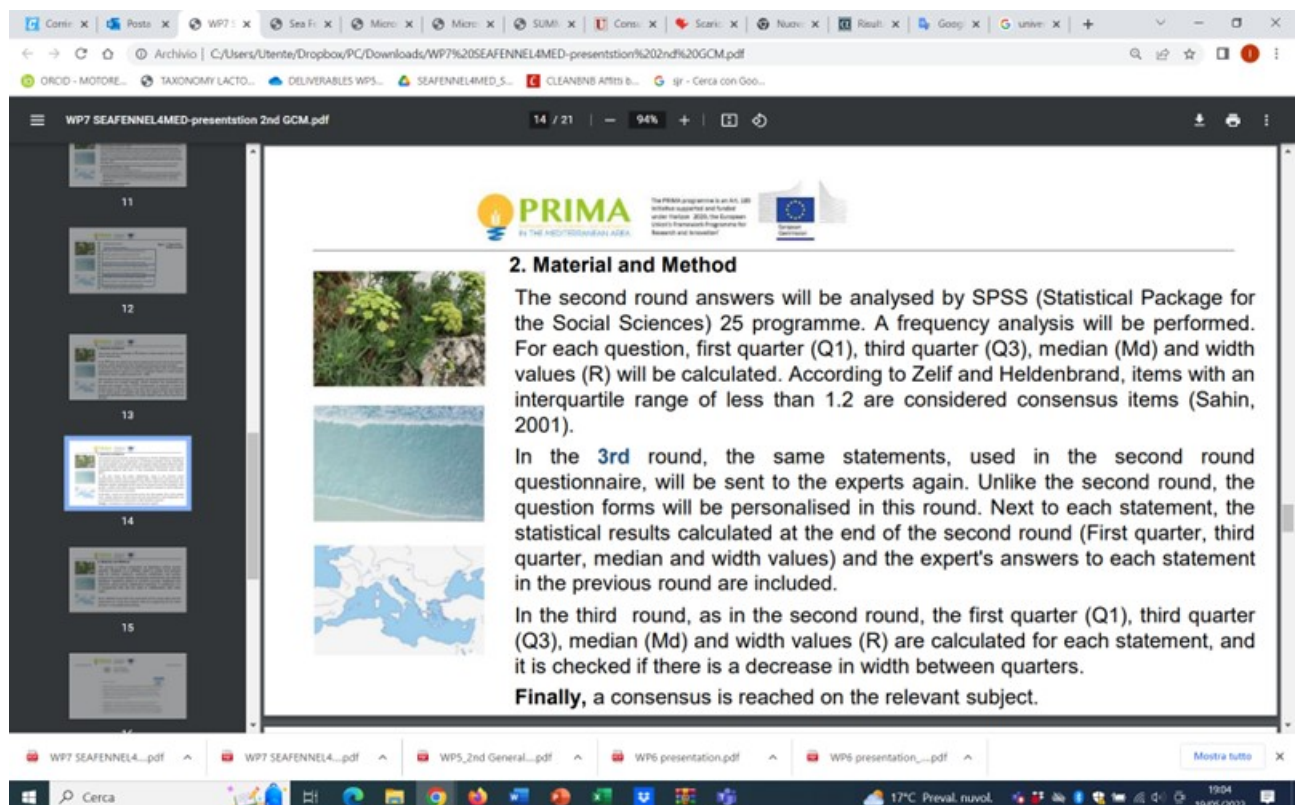
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2. Material and Method

The survey will be conducted in **3** phases to allow experts to react to each other's assessments.

In the **1st** step, the Delphi first round questionnaire will be sent to the experts, and they will be asked to list their thoughts and answers to each question. In the first round, the Delphi process traditionally starts with an open-ended questionnaire that is given to a panel of selected experts to solicit specific information about a subject (Custer et al., 1999).

After the first round of survey is completed, the answers given by the experts to the questions are brought together. Similar answers and expressions are grouped and merged. Then, a **2nd** questionnaire is prepared, in which all answers given to the questions in the first round by the experts are presented to the same group of experts and they are asked to rate their level of agreement with these statements. A **5 point attitude scale** will be used for this purpose.



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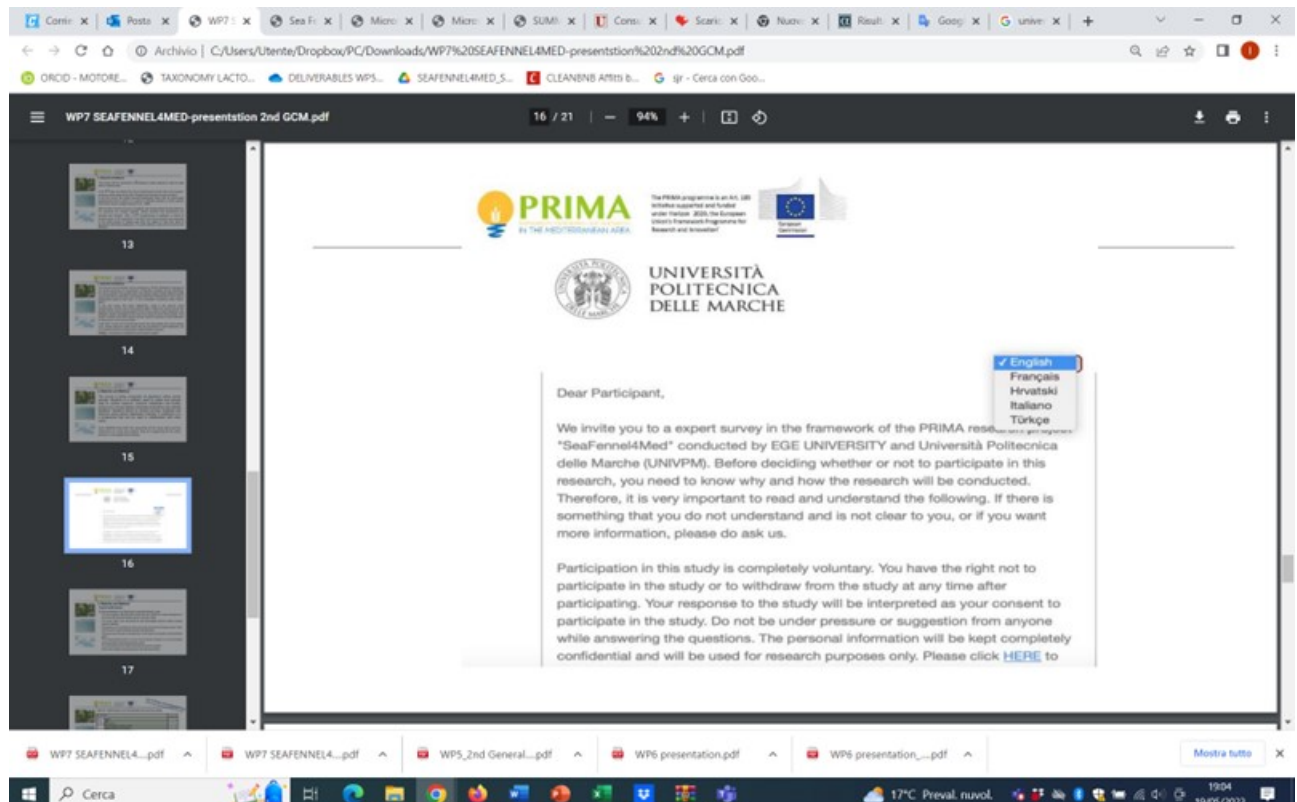
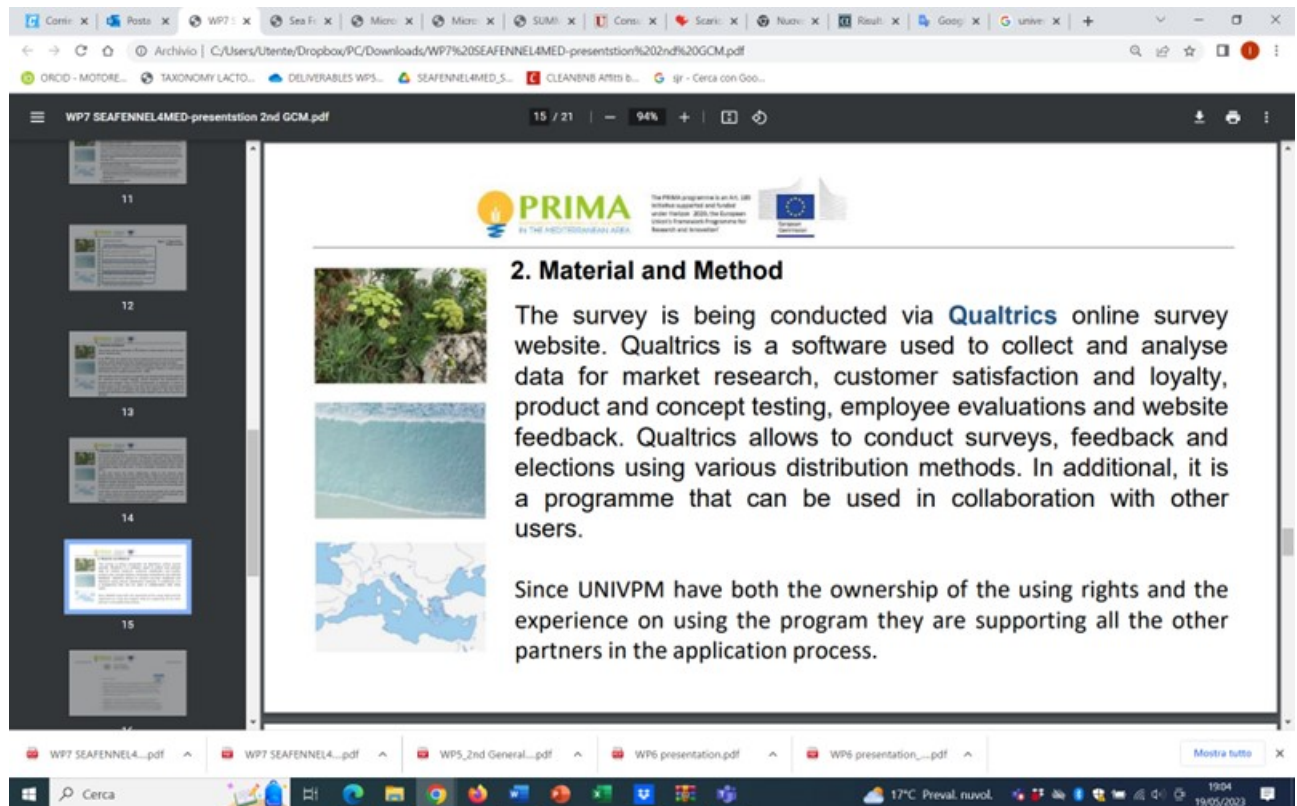
2. Material and Method

The second round answers will be analysed by SPSS (Statistical Package for the Social Sciences) 25 programme. A frequency analysis will be performed. For each question, first quarter (Q1), third quarter (Q3), median (Md) and width values (R) will be calculated. According to Zelif and Heldenbrand, items with an interquartile range of less than 1.2 are considered consensus items (Sahin, 2001).

In the **3rd** round, the same statements, used in the second round questionnaire, will be sent to the experts again. Unlike the second round, the question forms will be personalised in this round. Next to each statement, the statistical results calculated at the end of the second round (First quarter, third quarter, median and width values) and the expert's answers to each statement in the previous round are included.

In the third round, as in the second round, the first quarter (Q1), third quarter (Q3), median (Md) and width values (R) are calculated for each statement, and it is checked if there is a decrease in width between quarters.

Finally, a consensus is reached on the relevant subject.





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2. Material and Method
Topics addressed

The topics addressed in the Delphi study covered the following issues:

- The most important influences (key events) that have shaped the market development of sea fennel and sea fennel-based products in the past 5 years
- The current state of the sea fennel and sea fennel-based products market (including regional variations)
- Expectations on the development of the sea fennel and sea fennel-based products market over the next 10 years (including important new influences)
- The factors that may lead to the destruction of the natural environment of wild sea fennel plants
- The prerequisites/precautions to ensure that sea fennel cultivation is an environmentally and economically sustainable production activity
- The characteristics which make the sea fennel products successful
- Other issues relating to the development of the sea fennel market



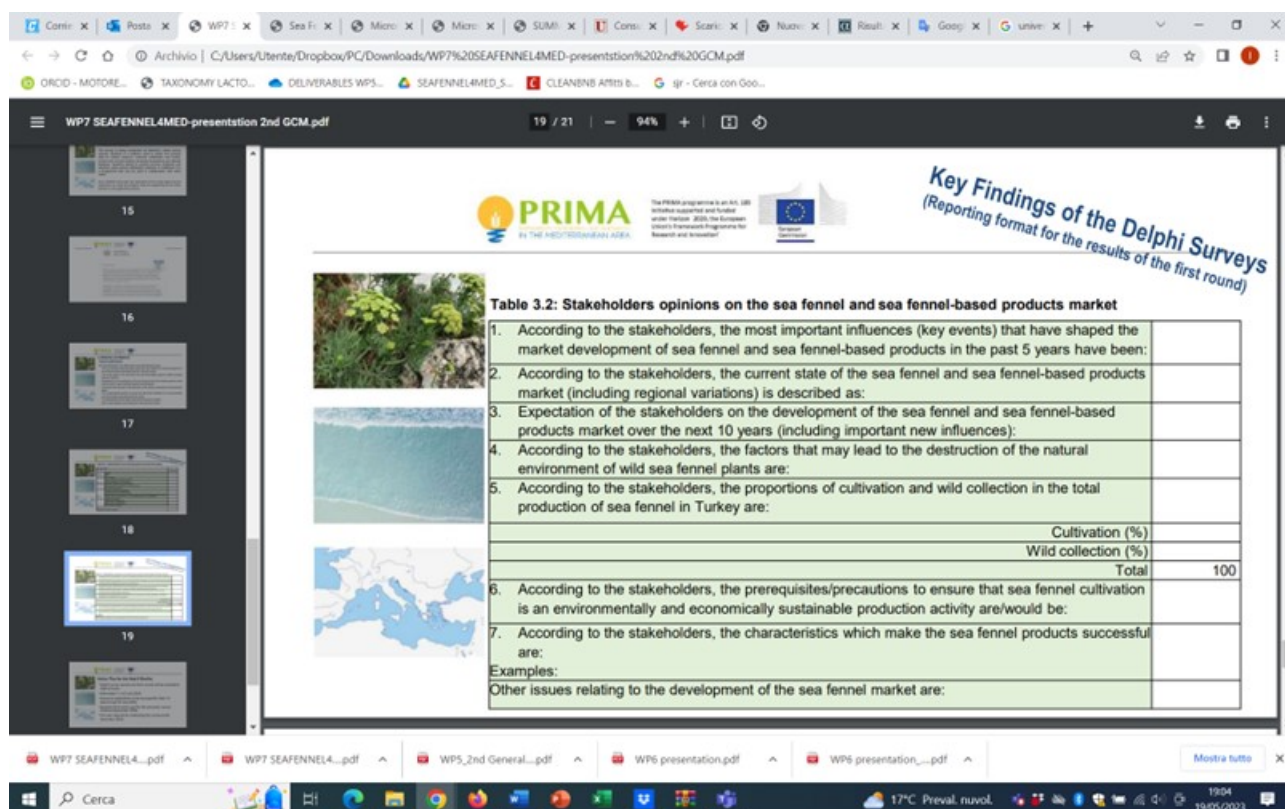
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Key Findings of the Delphi Surveys
(Reporting format for the results of the first round)

Table 3.1: Stakeholders socio-demographic characteristics (Italy)

	Frequency
Age (average)	
Gender	
Female	
Male	
Gender (number)	
Don't answer	
Education	
Lower secondary education or below	
Upper secondary and equivalents	
Bachelor's degree or equivalent level	
Postgraduate with master's or doctoral degree	
Other (please specify):	
Farmers and their organizations	
Processors and their organizations	
Retailers & their organizations (Super/Hypermarket Chains-Restaurants included)	
Private sector: Individual or Co. on Consulting / Control / Certification	
Sector (number)	
Academy/University	
Public sector: Researcher	
Public sector: Administration	
Other (please indicate)	
Experience (year) (Average)	

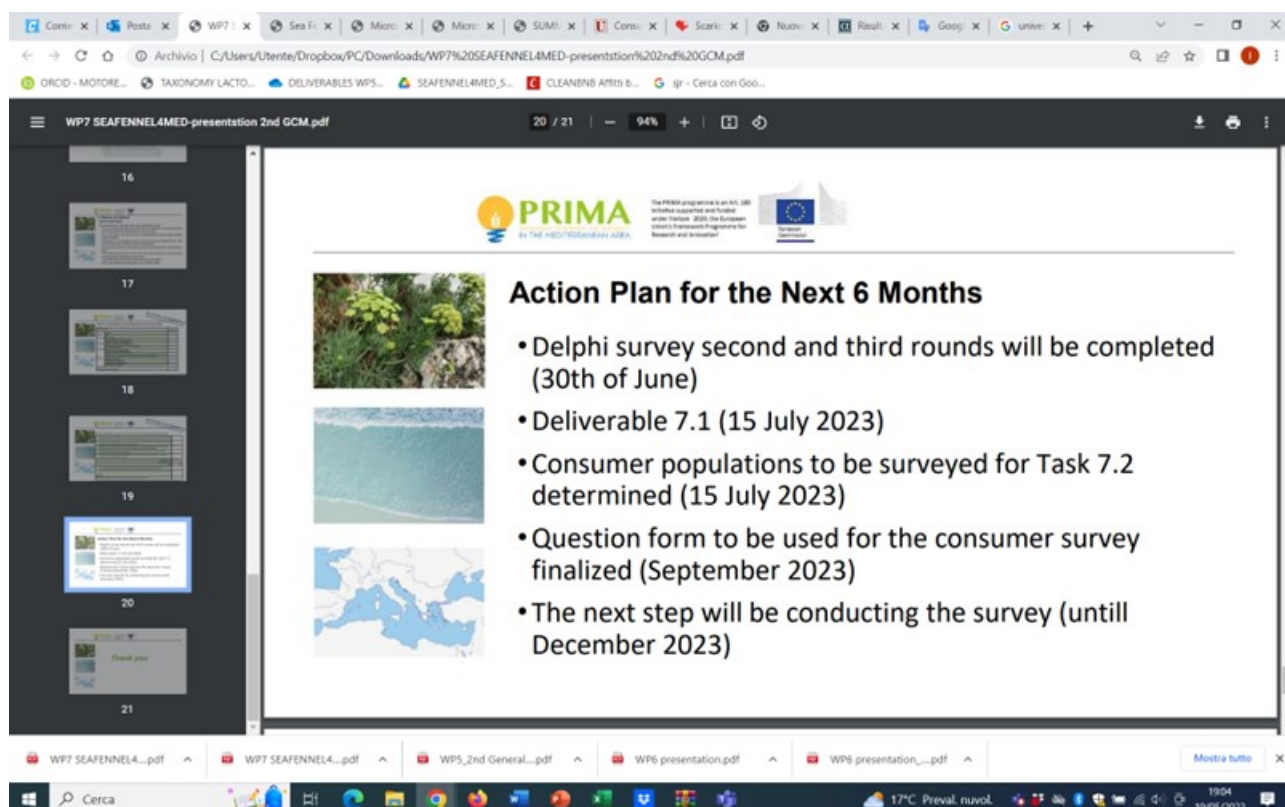


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Key Findings of the Delphi Surveys
(Reporting format for the results of the first round)

Table 3.2: Stakeholders opinions on the sea fennel and sea fennel-based products market

1. According to the stakeholders, the most important influences (key events) that have shaped the market development of sea fennel and sea fennel-based products in the past 5 years have been:	
2. According to the stakeholders, the current state of the sea fennel and sea fennel-based products market (including regional variations) is described as:	
3. Expectation of the stakeholders on the development of the sea fennel and sea fennel-based products market over the next 10 years (including important new influences):	
4. According to the stakeholders, the factors that may lead to the destruction of the natural environment of wild sea fennel plants are:	
5. According to the stakeholders, the proportions of cultivation and wild collection in the total production of sea fennel in Turkey are:	
	Cultivation (%)
	Wild collection (%)
	Total
	100
6. According to the stakeholders, the prerequisites/precautions to ensure that sea fennel cultivation is an environmentally and economically sustainable production activity are/would be:	
7. According to the stakeholders, the characteristics which make the sea fennel products successful are:	
Examples:	
Other issues relating to the development of the sea fennel market are:	



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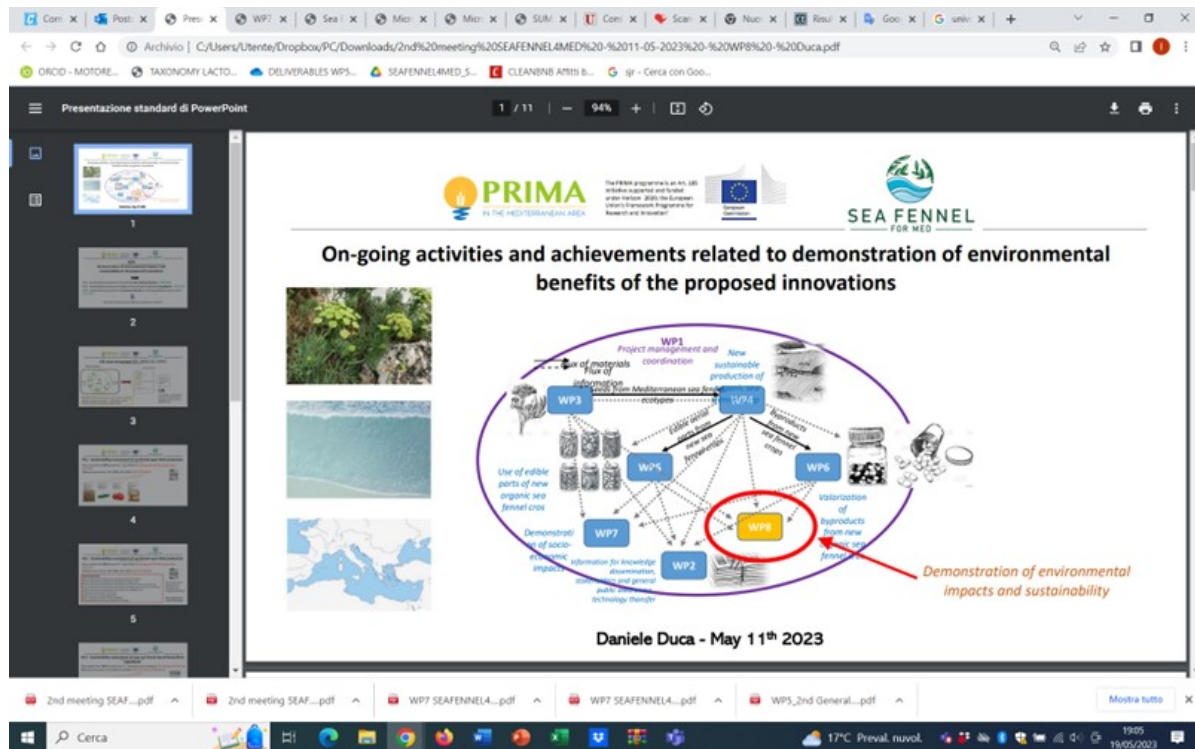
Action Plan for the Next 6 Months

- Delphi survey second and third rounds will be completed (30th of June)
- Deliverable 7.1 (15 July 2023)
- Consumer populations to be surveyed for Task 7.2 determined (15 July 2023)
- Question form to be used for the consumer survey finalized (September 2023)
- The next step will be conducting the survey (until December 2023)



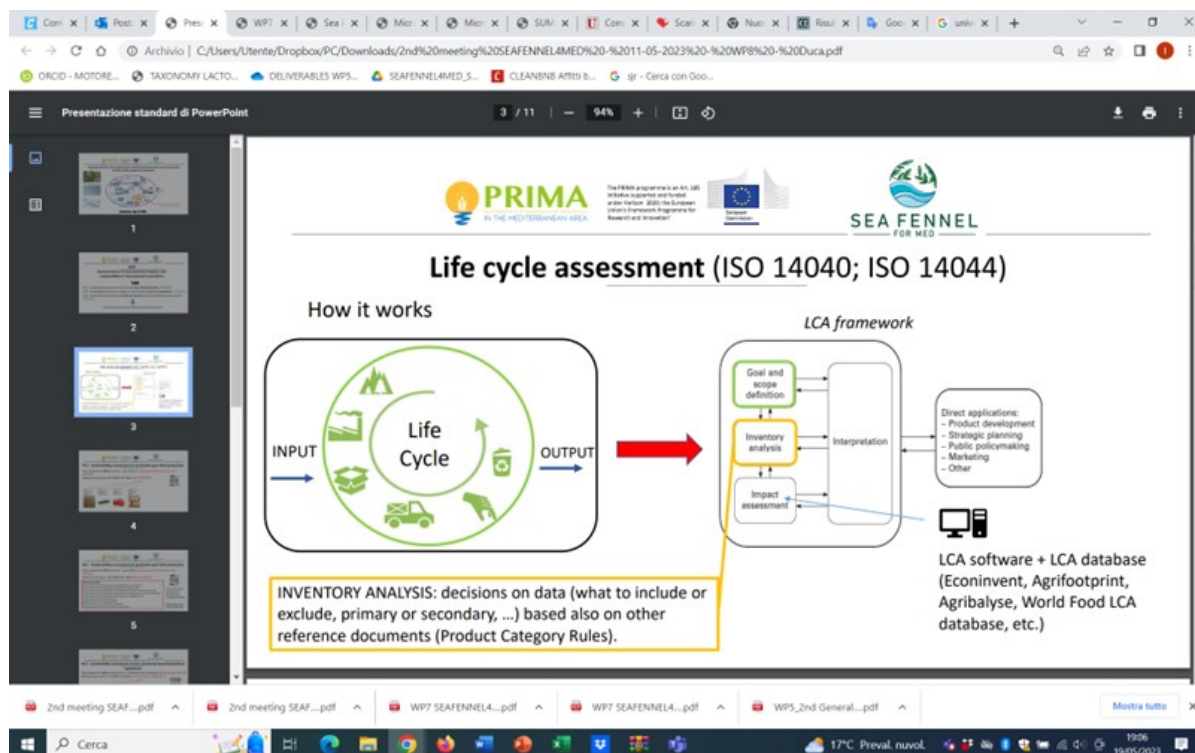
1.12 ANNEX VIII - WP8 PRESENTATION

– Prof Daniele Duca (WP8 Leader)



On-going activities and achievements related to demonstration of environmental benefits of the proposed innovations

Daniele Duca - May 11th 2023



Life cycle assessment (ISO 14040; ISO 14044)

How it works

INVENTORY ANALYSIS: decisions on data (what to include or exclude, primary or secondary, ...) based also on other reference documents (Product Category Rules).

LCA framework

Direct applications:

- Product development
- Strategic planning
- Public policymaking
- Marketing
- Other

LCA software + LCA database (Ecoinvent, Agrifootprint, Agribalyse, World Food LCA database, etc.)



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SEA FENNEL FOR MED

T8.1 - Sustainability assessment of sea fennel open field production

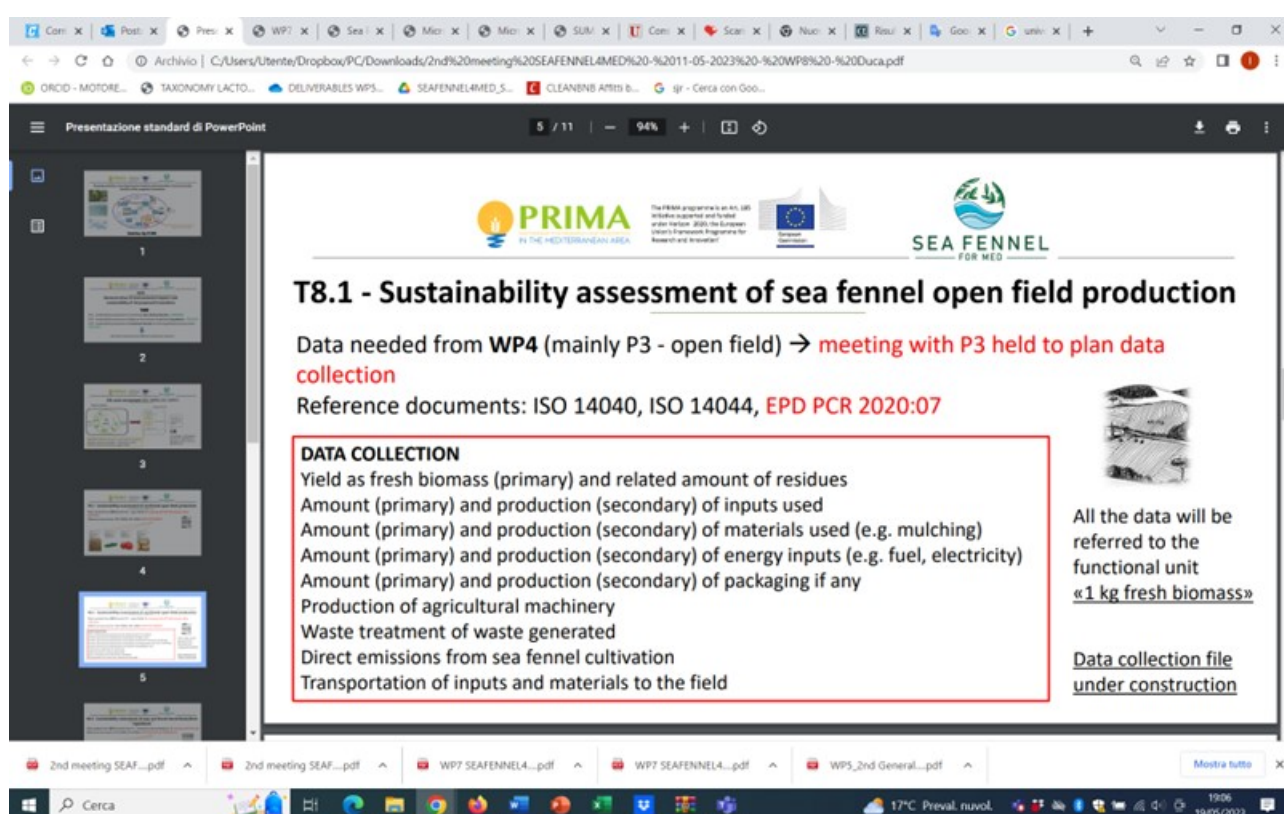
Data needed from WP4 (mainly P3 - open field) → **meeting with P3 held to plan data collection**

Reference documents: ISO 14040, ISO 14044, **EPD PCR 2020:07**

Four product categories are shown with arrows pointing to them from the text above:

- Durum Wheat from organic and... (Cooperative Produttori Agricoli...)
- Mini cucumber (THENCE GREENHOUSES S.A.)
- Beef tomato (THENCE GREENHOUSES S.A.)
- Seed Potato (02 Class) (TOSTON THERMAL REACTING...)

Taskbar: 2nd meeting SEAF...pdf, 2nd meeting SEAF...pdf, WP7 SEAFENNEL4...pdf, WP7 SEAFENNEL4...pdf, WPS_2nd General...pdf



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SEA FENNEL FOR MED

T8.1 - Sustainability assessment of sea fennel open field production

Data needed from WP4 (mainly P3 - open field) → **meeting with P3 held to plan data collection**

Reference documents: ISO 14040, ISO 14044, **EPD PCR 2020:07**

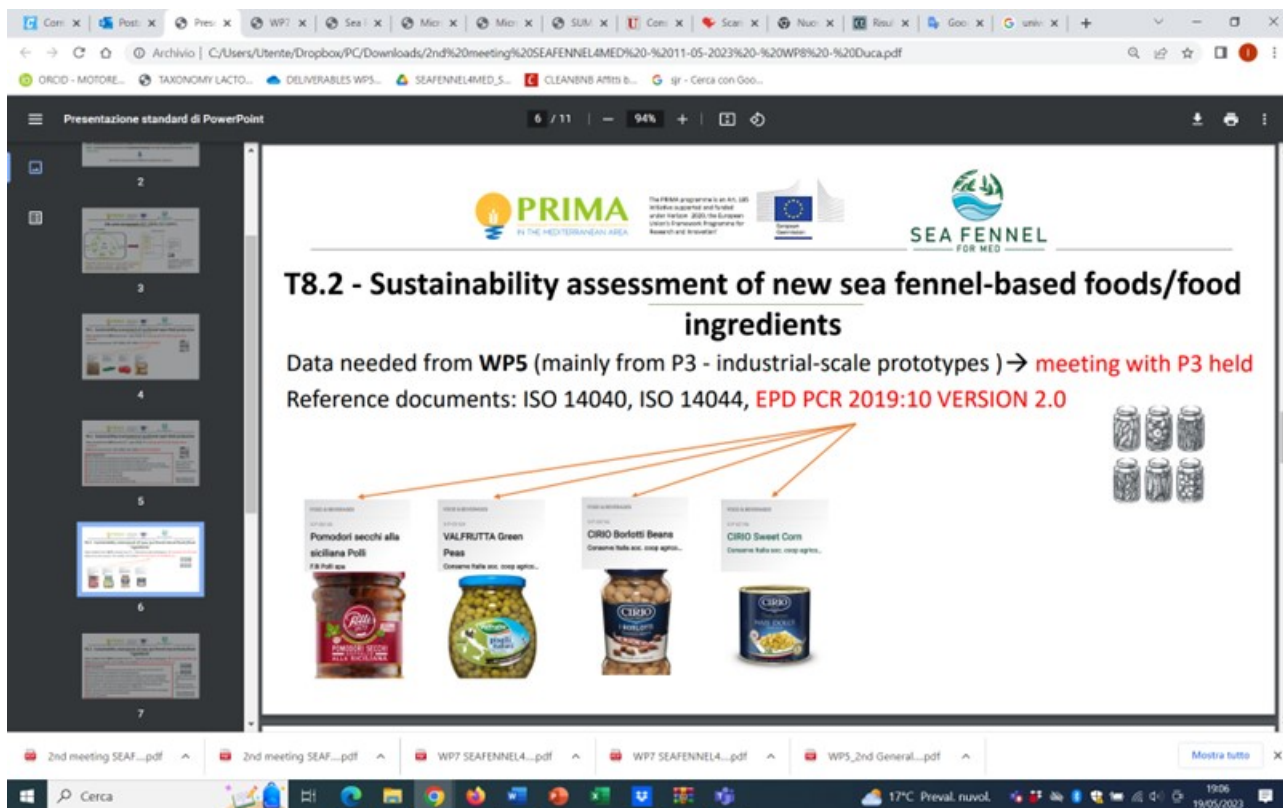
DATA COLLECTION

- Yield as fresh biomass (primary) and related amount of residues
- Amount (primary) and production (secondary) of inputs used
- Amount (primary) and production (secondary) of materials used (e.g. mulching)
- Amount (primary) and production (secondary) of energy inputs (e.g. fuel, electricity)
- Amount (primary) and production (secondary) of packaging if any
- Production of agricultural machinery
- Waste treatment of waste generated
- Direct emissions from sea fennel cultivation
- Transportation of inputs and materials to the field

All the data will be referred to the functional unit «1 kg fresh biomass»

Data collection file under construction

Taskbar: 2nd meeting SEAF...pdf, 2nd meeting SEAF...pdf, WP7 SEAFENNEL4...pdf, WP7 SEAFENNEL4...pdf, WPS_2nd General...pdf



T8.2 - Sustainability assessment of new sea fennel-based foods/food ingredients

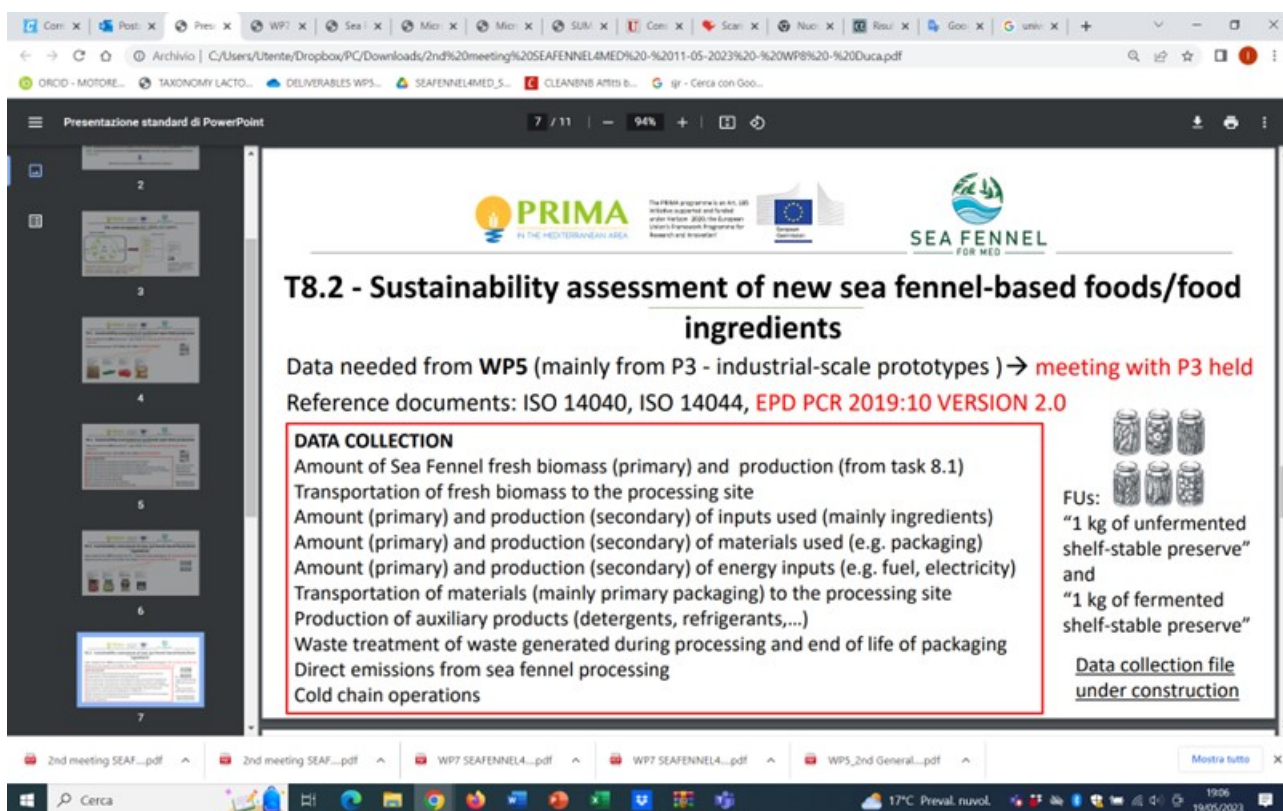
Data needed from WP5 (mainly from P3 - industrial-scale prototypes) → **meeting with P3 held**

Reference documents: ISO 14040, ISO 14044, **EPD PCR 2019:10 VERSION 2.0**

Four product images are shown with arrows pointing to them from the text above:

- Pomodori secchi alla siciliana Poli
- VALFRUTTA Green Peas
- ORIO Borlotti Beans
- ORIO Sweet Corn

Four cans of these products are displayed below the names.



T8.2 - Sustainability assessment of new sea fennel-based foods/food ingredients

Data needed from WP5 (mainly from P3 - industrial-scale prototypes) → **meeting with P3 held**

Reference documents: ISO 14040, ISO 14044, **EPD PCR 2019:10 VERSION 2.0**

DATA COLLECTION

- Amount of Sea Fennel fresh biomass (primary) and production (from task 8.1)
- Transportation of fresh biomass to the processing site
- Amount (primary) and production (secondary) of inputs used (mainly ingredients)
- Amount (primary) and production (secondary) of materials used (e.g. packaging)
- Amount (primary) and production (secondary) of energy inputs (e.g. fuel, electricity)
- Transportation of materials (mainly primary packaging) to the processing site
- Production of auxiliary products (detergents, refrigerants,...)
- Waste treatment of waste generated during processing and end of life of packaging
- Direct emissions from sea fennel processing
- Cold chain operations

Four cans of products are shown on the right.

FUs: "1 kg of unfermented shelf-stable preserve" and "1 kg of fermented shelf-stable preserve"

Data collection file under construction

PRIMA
IN THE MEDITERRANEAN AREA

The PRIMA programme is an EU, LfL initiative supported and funded under Horizon 2020, the European research & innovation programme for Research and Innovation!

SEA FENNEL
FOR MED

T8.3 - Sustainability assessment of functional extracts for food ingredients/nutraceuticals

Data needed from WP6 → **meeting to be held**

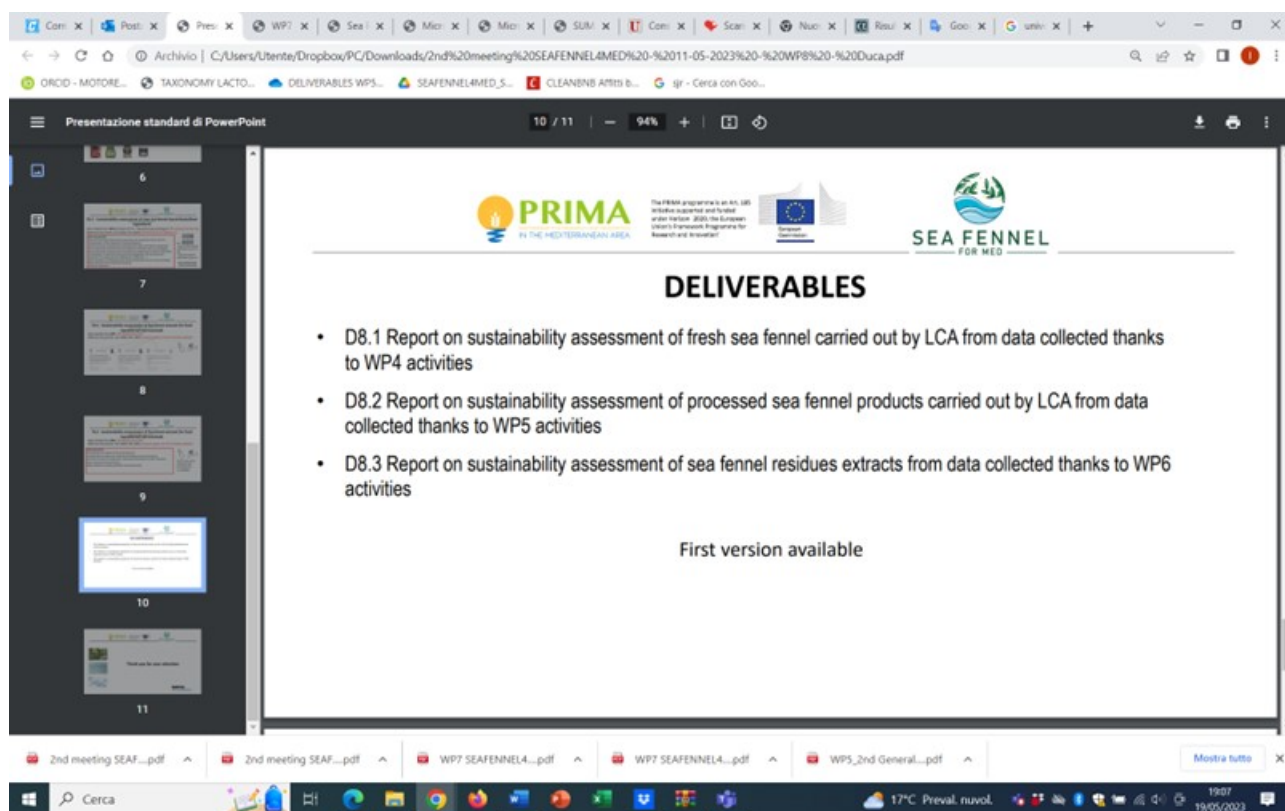
Reference documents: ISO 14040, ISO 14044, **research papers on LCA of similar products**

DATA COLLECTION

- Transportation of residues to the processing site
- Transportation of inputs and materials (if needed) to the processing site
- Amounts of inputs of energy (fuels, electricity) and materials used for extraction
- Direct emissions from processing
- Waste treatment of waste generated during processing



All the data will be referred to the functional unit
«1 g extract»



Presentazione standard di PowerPoint 10 / 11 94%

DELIVERABLES

- D8.1 Report on sustainability assessment of fresh sea fennel carried out by LCA from data collected thanks to WP4 activities
- D8.2 Report on sustainability assessment of processed sea fennel products carried out by LCA from data collected thanks to WP5 activities
- D8.3 Report on sustainability assessment of sea fennel residues extracts from data collected thanks to WP6 activities

First version available

Task area for your attention

2nd meeting SEAF...pdf 2nd meeting SEAF...pdf WP7 SEAFENNEL4...pdf WP7 SEAFENNEL4...pdf WPS_2nd General...pdf

Cerca 17°C. Prevail. nuvol. 19/05/2023



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Thank you for your attention

Daniele Duca
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Task area for your attention

2nd meeting SEAF...pdf 2nd meeting SEAF...pdf WP7 SEAFENNEL4...pdf WP7 SEAFENNEL4...pdf WPS_2nd General...pdf

Cerca 17°C. Prevail. nuvol. 19/05/2023

1.13 ANNEX IX - Multi-language survey



Fig.1. Screen for a collaborative and facilitated survey available in 6 languages. <https://seafennel4med.com/survey/>

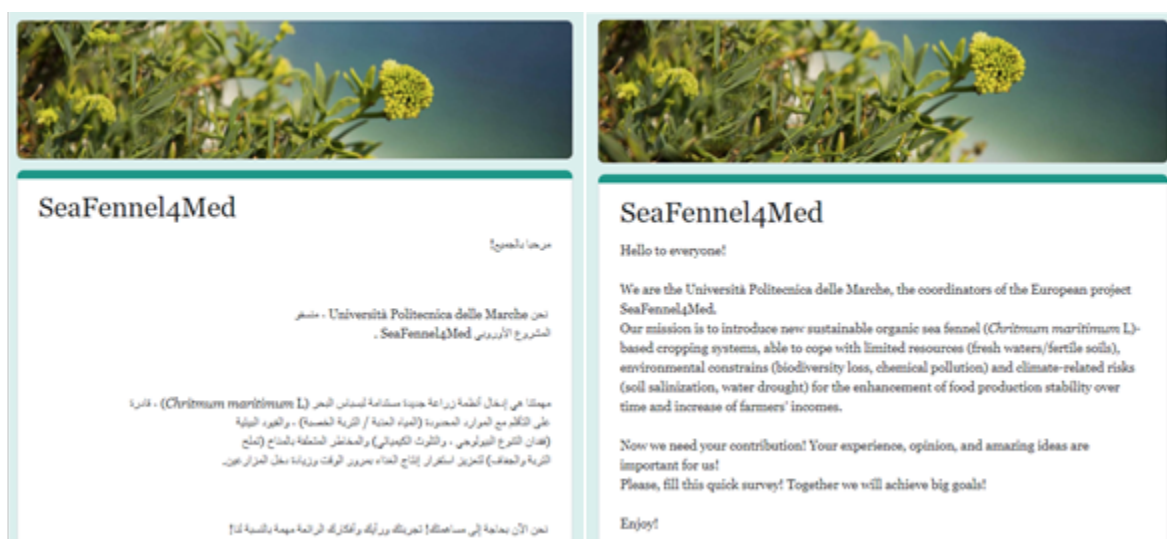


Fig.2. Screen for app mobile of the surveys in different languages for the stakeholders.

Section 1 (go to section 2):

Hello to everyone! We are the Università Politecnica delle Marche, the coordinators of the European project SeaFennel4Med. Our mission is to introduce new sustainable organic sea fennel (*Chritum maritimum* L)-based cropping systems, able to cope with limited resources (fresh waters/fertile soils), environmental constraints (biodiversity loss, chemical pollution) and climate-related risks (soil salinization, water drought) for the enhancement of food production stability over time and increase of farmers' incomes.

Now we need your contribution! Your experience, opinion, and amazing ideas are important for us!

Please, fill this quick survey! Together we will achieve big goals!

Enjoy

Section 2 (go to section 3):

Sea Fennel (*Chritum maritimum* L), also known as kritamo, St Peter's herb, or Rock Samphire, is a halophyte plant able to grow in rocky regions along the seacoast.

This plant has several usage areas, such as culinary, medicine, and cosmetics, because of its nutrient and phytochemical contents.

It is an aromatic plant with citrus fruits, carrots, and celery notes.

Section 3:

General Information

1. Sex:
 - Male
 - Female
 - Other
2. Age: ...
3. Where are you from?
 - Albania
 - Algeria
 - Croatia
 - Egypt
 - France
 - Greece
 - Israel
 - Italy
 - Lebanon
 - Libya
 - Malta
 - Morocco
 - Monaco
 - Spain
 - Palestine
 - Syria
 - Tunisia
 - Turkey
 - Other:
4. Have you already been contacted by SeaFennel4Med partners and are you included in the stakeholder list?
 - Yes
 - No
5. Which type of stakeholder are you?
 - Company (go to section 4)
 - Customer (go to section 5)

Section 4 (go to section 5):

Additional information

1. Name of the company: ...
2. Which sector do you work in?
 - Agriculture
 - Food Processing
 - Retailing
 - Research
 - Other: ...

Section 5:

“Sea fennel-based food”

Tell us about your experience.

1. Have you ever heard about sea fennel-based food?
 - Yes, I have tried sea fennel product(s) (go to section 6)
 - Yes, but I have never tried sea fennel products (go to section 7)
 - No, never (go to section 10)

Section 6 (go to section 8):

About your experience

1. Which type of product?
2. How much did you like it? (1-Not at all; 10-Very very much)
3. What did you not particularly like? ...
4. What did you like most? ...

Section 7 (go to section 8):

About your experience

Which type of product do you know? ...

Section 8:

About your experience

1. Through which channel did you become aware of it?
 - Stores
 - Internet
 - Other people
 - Local events
 - Project
 - Other: ...
2. Are there any typical dishes in your country where sea fennel is used?
 - Yes (go to Section 9)
 - No (go to section 11)

Section 9 (go to section 11):

About your experience

1. Describe the typical dishes prepared with sea fennel:
2. During which meal is it consumed?
 - Breakfast
 - Lunch
 - Dinner

- Snack

Section 10:

Are you interested in tasting sea fennel product(s)?

- Yes (go to section 11)
- Maybe (go to section 11)
- No (finish-send the module)

Section 11 (finish-send the module):

Share your idea!

1. Sea fennel is a very aromatic plant with citrus fruit, celery, carrots, and fennel notes. In which product category do you think it can be used as ingredient?

(You can choose more than one)

- Bakery products
 - Meat products
 - Fish products
 - Dairy products
 - Spreadable
 - Dressings
 - Beverages
 - Soups
 - Other: ...
2. Describe your ideal sea fennel-based food: ...
 3. During which meal would you consume it?
 - Breakfast
 - Lunch
 - Dinner
 - Snack
 - Other: ...