

DELIVERABLE D1.3

FINAL REPORT

CREIAMO Project

CREIAMO Project - Circular economy in olive oil and wine sectors. Valorization of by-products and residues through innovative processes and new business models

January 2022



CREIAMO_Project

Circular Economy in olive oil and wine sectors. Valorization of by-products and residues through innovative processes and new business models

CREIAMO Project - Circular economy in olive oil and wine sectors. Valorization of by-products and residues through innovative processes and new business models

Partners:

University of Brescia (Italy), Department of Civil Engineering, Architecture, Land, Environment and Mathematics.

ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development) – Sustainability Department. Environmental Technologies Technical Unit.

University of Milano – Bicocca (Italy), Department of Earth and Environmental Sciences (DISAT).

Funded by:

Fondazione Cariplo, Milan (Italy).

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1. GENERAL INFORMATION OF THE PROJECT

1.1. Project title

Circular economy in olive oil and wine sectors. Valorisation of by-products and residues through innovative processes and new business models (CREIAMO).

1.2. General objective

The general aim of the project is to contribute to the reuse and valorization of residues and wastes from the olive oil and wine production chains.

1.3. Specific objectives

The project has 4 Specific Objectives (SO):

- SO1 Development of a new biological strategy to produce biosurfactants using wastes derived from the oil and wine production (WP2)
- SO2 Definition of the operating procedures to use the biosurfactants for the remediation of contaminated soil (WP3)
- SO3 Assessment of the impact of the processes and products through LCA studies (WP4)
- SO4 Promotion of cross-sectorial synergies among the companies (WP5)

2. TEAM OF RESEARCHERS CREIAMO PROJECT

2.1. Principal Investigators:



MENTORE VACCARI: Ph.D in Sanitary Engineering. Associate Professor of Sanitary and Environmental Engineering at the University of Brescia (Italy), Department of Civil Engineering, Architecture, Land, Environment and Mathematics



SILVIA SBAFFONI: Ph.D in Environmental Engineering. Researcher at the ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development) – Sustainability Department. Environmental Technologies Technical Unit



ANDREA FRANZETTI: Ph.D in Environmental sciences. Associate Professor of Microbiology. Course Applied microbiology and Environmental Sciences at the University of Milano – Bicocca (Italy), Department of Earth and Environmental Sciences (DISAT)

2.2. Postdoctoral Researchers:



TIZIANA BELTRANI: Ph.D in Environmental Sciences. Researcher at the ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development). – Member of the Resource Valorisation Laboratory (RISE)



ALIF CHEBBI: Ph.D in Biological Engineering, is currently a Postdoctoral researcher at the MicroDISAT Research Group of the Department of Earth and Environmental Sciences, University of Milano – Bicocca – Italy



FRANCO HERNÁN GÓMEZ: Chemical Engineer, Master in Renewable Energy, Ph.D in Appropriate methodologies and techniques in international development cooperation. Is currently a Postdoctoral researcher at the Dept. of DICATAM – University of Brescia – Italy



EMANUELA DE MARCO: Urban Planner, graduated in Urban Territorial and Landscape-Environmental Planning at UNINA (2010). Ph.D in Urban Design and Planning (2016). Is currently Research Fellow at the ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development)

2.3. Young Researchers:



FRANCINE DUARTE: Chemical Engineer. Master's degree in Chemical Engineering, is currently a PhD student in Environmental Engineering at the University of Brescia, Italy



DANIELE FIORINO: Research Fellow for ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development)



REZA VAHIDZADEH: Chemical Engineering. PhD student in Environmental Engineering at the University of Brescia (Italy). Member of the laboratory of sustainability technologies (ENEA – UNIBS).



ERIC MEHNER: Recycling Engineer. Master's degree in resource Recovery, is currently a PhD student in Environmental Engineering at the University of Brescia in collaboration with ENEA, Italy



TEKLIT GEBREGIORGIS AMBAYE PhD researcher in valorization of resources from residues at Università degli Studi di Brescia, Italy



LUCA MASTELLA PHD Student in Converging Technologies for Biomolecular Systems (TeCSBi), University of Milano – Bicocca, Italy

2.4. College students involved / thesis

MASSIMILIANO TAZZARI: Department of Earth and Environmental Sciences, University of Milano – Bicocca

MARTINA GRETA CAFFI: Department of Civil Engineering, Architecture, Land, Environment and Mathematics, University of Brescia

RICCARDO BOTTICINI: Department of Civil Engineering, Architecture, Land, Environment and Mathematics, University of Brescia

SERGIO SCATTOLINI: Department of Civil Engineering, Architecture, Land, Environment and Mathematics, University of Brescia

BEATRICE MURENA: Department of Earth and Environmental Sciences, University of Milano – Bicocca

3. EXPERIMENTAL PLAN

METHODS AND ACTIONS PLANNED - ROLE OF PARTNERS

WPs and TASKS	UniBS	UniMiB	ENEA
WP1 - PROJECT COORDINATION	Leader UniBS		
T1.1 - Start-up of the consortium/Kick-off meeting	X	x	x
T1.2 - Coordination and monitoring of activities	X	x	x
T1.3: Budget management and reporting activities	X	x	x
WP2 - PRODUCTION OF BIO-SURFACTANTS FROM RESIDUES OF OLIVE OIL AND WINE SECTORS	Leader UniMiB		
Task 2.1 - Background and case study definition	X	x	
Task 2.2 - Isolation of bio-surfactants producers from residues of olive oil and winery residues	x	X	
Task 2.3 - Production Optimization and chemical characterization of bio-surfactants from residues of olive oil and winery residues	x	X	
Task 2.4 - Ecotoxicity Assessment of the biosurfactant produced before and after purification	x	X	
WP3 - TREATMENT OF CONTAMINATED SOIL BY USING BIO-SURFACTANTS PRODUCED FROM RESIDUES OF OLIVE OIL AND WINE SECTORS	Leader UniBS		
Task 3.1 - Bio-surfactant assisted washing of soil contaminated with hydrocarbons	X	x	
Task 3.2 - Bio-surfactant assisted bioremediation of soil contaminated with hydrocarbons	X	x	
WP4 - ENVIRONMENTAL ASSESSMENT THROUGH LIFE CYCLE ASSESSMENT	Leader UniBS		
Task 4.1 - Definition of scenarios and identification of system boundaries	x		X
Task 4.2 - Life Cycle Assessment (LCA) studies and environmental Life Cycle Costing (LCC) studies	X	x	x
WP5 - INDUSTRIAL SYMBIOSIS FOR THE CROSS-SECTORIAL VALORISATION OF THE RESIDUES OF OLIVE OIL AND WINE SECTORS	Leader ENEA		
Task 5.1 - Companies involvement campaign	X		x
Task 5.2 - Industrial symbiosis events (matchmaking) with companies	x		X
Task 5.3 - Analysis and elaboration of data on possible synergies. Preparation of operative manuals	x		X
WP6 - COMMUNICATION AND DISSEMINATION	Leader UniBS		
Task 6.1 - Project website and logo	X	x	x
Task 6.2 - Management of appropriate social platforms, e-newsletter	X	x	x
Task 6.3 - Promotional materials and publications	X	x	x

4. TIMETABLE UNTIL MONTH 30 OF THE PROJECT

WPs and TASKS	2019						2020												2021											
	J	A	S	O	N	D	G	F	M	A	M	J	J	A	S	O	N	D	G	F	M	A	M	J	J	A	S	O	N	D
WP1																														
T1.1																														
T1.2																														
T1.3																														
WP2																														
Task 2.1																														
Task 2.2																														
Task 2.3																														
Task 2.4																														
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Task 3.1																														
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Task 4.2																														
WP5																														
Task 5.1																														
Task 5.2																														
Task 5.3																														
WP6																														
Task 6.1																														
Task 6.2																														
Task 6.3																														

--- December 2021 - 30th month of the project

5. MONITORING AND EVALUATION PLAN (M&E) UNTIL MONTH 30 OF THE PROJECT

The monitoring and evaluation plan (M&E) has been developed during and at the end of the project, using a scheme that includes the following elements, defined by the project partners, as exemplified in the following figure:

- WPs and tasks
- Role of partners
- Time schedule initially planned and month of completion
- Targets / result to current date (month 30 of the project)
- Tasks completion to current month (%)

WPs and TASKS	Monitoring and Evaluation (M&E) Plan			
	Month of completion	Current Month	Targets / Result to current date	Tasks completion to current month (%)
WP1 – PROJECT COORDINATION				
T1.1 - Start-up of the consortium/Kick-off meeting	1	30	27 meetings with partners ENEA/BICOCCA/UNIBS	100%
T1.2 - Coordination and monitoring of activities	30			
T1.3: Budget management and reporting activities	30			
WP2 – PRODUCTION OF BIO-SURFACTANTS FROM RESIDUES OF OLIVE OIL AND WINE SECTORS				
Task 2.1 – Background and case study definition	4	30	3-4 bacterial strains will be able to produce BSs (Rhamnolipids) on winery wastes and olive oil mill	100%
Task 2.2 – Isolation of bio-surfactants producers from residues of olive oil and winery residues	15		2 Screening BS producers on those agriculture wastes	100%
			1 Perform the first biodiversity study (Domain bacteria) and identification of microbial consortia and bacteria, able to reduce surface tension	
Task 2.3 – Production Optimization and chemical characterization of bio-surfactants from residues of olive oil and winery residues	15		Improve the standard media using low costs carbon sources (or conditions) for growing the selected BS-producing bacteria.	100%
			(1 g /l) Production yield	
Task 2.4 – Ecotoxicity Assessment of the biosurfactant produced before and after purification	21	1 The yields of production, 1 the critical micelle concentration (CMC), 1 partial chemical characterization 1 BS tested and approved 1 Large-scale production of the BS	100%	
WP3 – TREATMENT OF CONTAMINATED SOIL BY USING BIO-SURFACTANTS PRODUCED FROM RESIDUES OF OLIVE OIL AND WINE SECTORS				
Task 3.1 – Bio-surfactant assisted washing of soil contaminated with hydrocarbons	25	30	Soil washing tests, 3g of contaminated soil and 15 ml of washing solution, using for the latter the two concentrations C1 = 1CMC and C2 = 2CMC and C0 (deionized water) for the contact times of 0.5, 2 and 6 hours, repeating each test 2 times thus obtaining a total of 18 tests	100%
Task 3.2 – Bio-surfactant assisted bioremediation of soil contaminated with hydrocarbons	25		Experimental use of soil improvers in the biological treatment of soils contaminated by hydrocarbons and analysis of the management data of the Sistemi Ambientali plant	100%
WP4 – ENVIRONMENTAL ASSESSMENT THROUGH LIFE CYCLE ASSESSMENT				
Task 4.1 – Definition of scenarios and identification of system boundaries	12	30	Purchase of laptop and Simapro software. Organization of the training course on Life Cycle Assessment (LCA) and environmental Life Cycle Costing (LCC)	100%
Task 4.2 – Life Cycle Assessment (LCA) studies and environmental Life Cycle Costing (LCC) studies	28		Inventory development, definition of assessment method, disposal scenario, LCA calculation and LCC calculation using Simapro software	100%
WP5 – INDUSTRIAL SYMBIOSIS FOR THE CROSS-SECTORIAL VALORISATION OF THE RESIDUES OF OLIVE OIL AND WINE SECTORS				
Task 5.1 – Companies involvement campaign	17	30	74 companies in the database	100%
Task 5.2 – Industrial symbiosis events (matchmaking) with companies	19		3 industrial symbiosis events 74 companies involved	100%

WP6 – COMMUNICATION AND DISSEMINATION							
Task 6.1 - Project website and logo	6	30	Link web site and logo			100%	
Task 6.2 - Management of appropriate social platforms, e-newsletter	29		Nesletter 1, 2, 3, 4, 5, 6	Link: e-mail contact and Social network			100%
Task 6.3 - Promotional materials and publications		Facebook Creiamo project	Twitter Creiamo project	LinkedIn Creiamo project	YouTube channel Creiamo project	News, posters, seminars and workshops	
		Project Information Session No. 1	Project Information Session No. 2	Project Information Session No. 3 Final Conference	Link Deliverables and Training		

6. DELIVERABLES UNTIL MONTH 30 OF THE PROJECT

N.	Deliverable name	Type*	Accessibility	Month of completion	Access	Final status
D1.1	Project management plan	R	Public	2	Link	OK
D1.2	Progress Report	R	Public	18	Link	OK
D1.3	Final Report	R	Public	30	Link	OK
D2.1	Report on biosurfactant produced from wine sector residues	R	Confidential	15		OK
D2.2	Report on biosurfactant produced from olive sector residues	R	Confidential	15		OK
D2.3	Report on ecotoxicological studies of biosurfactant-containing broths	R	Confidential	19		OK
D3.1	Report on biosurfactant assisted washing of contaminated soil	R	Confidential	25		OK
D3.2	Report on biosurfactant assisted bioremediation of contaminated soil	R	Confidential	25		OK
D4.1	LCA studies	R	Confidential	28		OK
D4.2	LCC studies	R	Confidential	28		OK
D5.1	Report on the industrial symbiosis activities	R	Public	18	Link	OK
D5.2	Technical dossiers on the main synergies identified	R	Confidential	29		OK
D6.1	Stakeholder mapping	R	Public	6	Link	OK
D6.2	Project logo and visual identity	DEC	Confidential	4		OK
D6.3	Communication tools development	DEC	Confidential	4		OK
D6.4	Project website	DEC	Public	4	Link	OK
D6.5	Dissemination Plan	R	Confidential	3		OK
D6.6	Social media (communication strategy)	R	Confidential			OK
D6.7	Newsletter	DEC	Public	7 11 16 19 29 30	Link	OK
D6.8	Publications	R	Public	15 30	Link	OK
D6.9	Project Information Sessions and Final Conference	DEC	Public	6 12 20 30	Link	OK

*R: document, report (excluding the project periodic or final reports), DEM: demonstrator, pilot, prototype, plan designs; DEC: websites, patents filing, press & media actions, videos, etc. and OTHER: software, technical diagram, etc.

7. MILESTONES UNTIL MONTH 30 OF THE CREIAMO PROJECT

N.	Name	Month of achievement	Responsible	Final status
M1.1	Kick-off meeting organized in Brescia	M1	UniBS	OK
M1.2	Projects review meetings via Telcos or Meetings	M6, M12, M18, M22, M28	UniBS	OK
M1.3	End of funding period and closure of the activities	M30	UniBS	OK
M2.1	Case study defined	M4	UniBS	OK
M2.2	Isolation of bio-surfactants producers from residues of olive oil and winery residues	M15	UniMiB	OK
M2.3	Production Optimization and chemical characterization of bio-surfactants from residues of olive oil and winery residues	M15	UniMiB	OK
M2.4	Contract for consultancy	M15	UniMiB	OK
M3.1	External chemical analyses	M18	UniBS	OK
M3.2	Contract for consultancy (agronomist)	M6	UniBS	OK
M3.3	Treatment of contaminated soil by using bio-surfactants from olive oil and winery residues	M25	UniBS	OK
M3.4	Technical/economic feasibility of the process	M25	UniBS	OK
M4.1	Environmental and sustainability verified	M28	UniBS	OK
M5.1	Stakeholder and companies involved in industrial symbiosis working tables	M17	ENEA	OK
M6.1	Project web site	M4	UniBS	OK

8. DISSEMINATION PLAN OF CREIAMO PROJECT

Dissemination tool	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	Final status
Preparation of promotional and publicity materials and documents			X									X			X					X				X							OK
Digital and multimedia materials			X							X						X					X			X							OK
Website news and articles			X								X				X						X			X						X	OK
e-mail marketing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OK
Events					X							X					X	X		X										X	OK
LinkedIn	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OK
Twitter	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OK
Press release											X						X	X		X										X	OK

8.1. DISSEMINATION OF PROJECT ACTIVITIES

Conferences organised by the Creiamo project:

- Convegno "Economia Circolare e valorizzazione degli scarti di produzione di vivo e olio di oliva", Brescia, 17 giugno 2020. [Information Session](#)
- Convegno "Soluzioni innovative e simbiosi industriale per il recupero e la valorizzazione degli scarti agricoli nelle operazioni di risanamento ambientale", Brescia, 29 aprile 2021. [Information Session](#)
- Convegno conclusivo "Economia circolare delle filiere olivicola e vitivinicola. Valorizzazione dei sottoprodotti e degli scarti tramite processi innovativi e nuovi modelli di business", Brescia, 25 gennaio 2022. [Information Session](#)

Meetings at Consortia of producers

- Consorzio Tutela del Lugana, Sirmione, 2 dicembre 2019
- Consorzio Valtenesi, Puegnago, 10 dicembre 2019
- Consorzio Tutela del Lugana, Sirmione, 15 dicembre 2021

Participation of Creiamo project in scientific conferences:

- CEST 2019 16th International Conference on Environmental Science and Technology, Rhodes, Greece, 4 - 7 September 2019.
- Workshop SiCon 2020 "Siti contaminati. Esperienza negli interventi di risanamento", Facoltà di Ingegneria Civile e Industriale, Sapienza Università di Roma, 12-14 febbraio 2020.
- Convegno "Tecnologie innovative e sostenibili per la bonifica dei siti inquinati: recenti evoluzioni della ricerca applicata nazionale e internazionale", Ecomondo, Rimini, 5 novembre 2020.
- I Congress on Sustainable Entrepreneurship, (virtual edition) Colombia, 11-12 November 2020.
- Webinar 'Lombardia circolare - Simbiosi industriale', Milano, 18 novembre 2020.
- Workshop SiCon 2021 "Siti contaminati. Esperienza negli interventi di risanamento", Catania, 11-13 febbraio 2021.
- Bioeconomy day, Università di Milano Bicocca, 1 giugno 2021.
- Euro-Mediterranean Conference for Environmental Integration. Sousse, Tunisia, 11 June 2021.
- SIDISA 2021 XI International Symposium on Environmental Engineering, Turin, Italy, 29 June – 2 July 2021.
- Convegno 'Green deal ed economia circolare: le potenzialità della simbiosi industriale per la transizione ecologica', Fiera Ecomed. Catania, 15 luglio 2021.
- 7th International Conference on Industrial and Hazardous Waste Management, Crete, Greece, 29 July 2021.
- RemTech Europe, International Conference and Exhibition on land and water remediation markets and technologies, Ferrara. 21 September 2021.
- MEETmeTONIGHT 2021: Notte Europea dei Ricercatori, Brescia, 24 settembre 2021.
- Convegno "Il contributo ed il potenziale della Simbiosi Industriale per la Transizione ecologica", Fiera Ecomondo, Rimini, 27 ottobre 2021.
- 8ª Jornada de Emprendimiento y proyección internacional, Instituto Universitario de la Paz, Colombia, 18 November 2021.
- Webinar "Esempi di Simbiosi nel settore industriale italiano", 23 novembre 2021.
- Workshop SiCon 2022 "Siti contaminati. Esperienza negli interventi di risanamento", Brescia, 9-11 febbraio 2022.

Scientific articles published by the Creiamo project:

- Potentials of Winery and Olive Oil Residues for the Production of Rhamnolipids and Other Biosurfactants: A Step Towards Achieving a Circular Economy Model. [LINK](#)
- Burkholderia thailandensis E264 as a promising safe rhamnolipids' producer towards a sustainable valorization of grape marcs and olive mill pomace. [LINK](#)
- Remediation of soil polluted with petroleum hydrocarbons and its reuse for agriculture: Recent progress, challenges, and perspectives. [LINK](#)

Visits and subscribers in the social networks of the Creiamo project:

Web site of the project: 140 visits per day (peak day). Newsletter subscribers: 525 people. Twitter of the project: 1200 views per month (Average). Youtube channel: 42 videos uploaded.