The PROLIFIC project – an overview

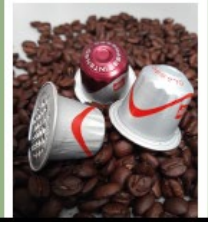
Workshop Residual Biomasses for Eco-compatible and Sustainable Food Packaging

11-12 September 2019
Trieste, Italy

Annalisa Tassoni, PROLIFIC Scientific Coordinator, UNIBO

WORKSHOP

Residual Biomasses for Eco-compatible and Sustainable Food Packaging



11-12 September 2019
Trieste, Italy
AREA Science Park -
Ed. C1 - Conference Hall

Wednesday, 11 September 2019

14:30 - 15:00 Registration & Welcome
15:00 - 15:15 The PROLIFIC project - an overview
Annalisa Tassoni - University of Bologna - Italy
PROLIFIC Scientific Coordinator
15:15 – 15:45 Biorefinery: from agrifood waste to value-added chemicals
Lucia Gardossi - University of Trieste - Italy
15:45 - 16:15 Valorization strategies of food residues towards sustainable materials
Annamaria Celli - University of Bologna - Italy
16:15 – 16:45 Coffee Break
16:45 – 17:15 Biobased and sustainable food packaging
Patrizia Cinelli - University of Pisa - Italy
17:15 – 17:45 Monomers and materials from coffee by-products
Luciano Navarini - illycaffè spa - Italy

Thursday, 12 September 2019

09:00 – 09:30 Conserve Italia's approach to sustainability
Marika Bondi - Conserve Italia - Italy
09:30 – 10:00 COOPBOX's experience in bio-based packaging: starting from PLA and continuing with the GLOPACK project
Silvia Codelupi, R&D COOPBOX Group S.p.A. - Italy
10:00 – 10:30 Valorisation of agri-food residues for the food packaging sector: potentials and criticalities
Giorgia Spigno – S. Cuore University Piacenza - Italy
10:30 – 11:00 Coffee break
11:00 – 11:30 Polyhydroxyalkanoates (PHA)-compounds in food packaging applications
Carsten Niermann - FKuR Kunststoff GmbH - Germany
11:30 – 12:00 Sustainable food packaging materials
Osvaldo Bosetti - Goglio S.p.A. – Italy
12:00 Farewell

For more info visit
www.prolific-project. eu

Registration

Participation is free of charge. But registration is mandatory. Please send an email with your name and affiliation to illyworkshop@prolific-project.eu before 31 August 2019. Available places are limited. We will confirm you registration.

Organised by

PROLIFIC

This project has received funding from the Bio Based Industries Joint Undertaking (JU) under grant agreement No 790157. The JU receives support from the European Union's Horizon 2020 research and Innovation programme and the Bio Based Industries Consortium.

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Horizon 2020
European Union funding
for Research & Innovation

BIO-BASED INDUSTRIES
Public-Private Partnership

Bio-based Industries
Consortium

PROLIFIC

PROJECT: **PROLIFIC (2018-2022) financed by H2020-BBI-JU (GA n. 790157)**

Integrated cascades of **PRO**cesses for the extraction of proteins and bioactive molecules from **L**egumes, **F**ungi and **C**offee agro-industrial side streams

Philippe Corvini (FHNW, administrative EU coordinator)

Annalisa Tassoni (UNIBO, scientific EU coordinator)

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PROLIFIC

BBI 2017.R4 – PROTEINS AND OTHER BIOACTIVE INGREDIENTS FROM SIDE STREAMS AND RESIDUES - Deadline 7th September 2017

RIA project (Research & Innovation Action)

Grant Agreement N°: 790157

Duration: 4 years

Project started 1st September 2018 – Ends 31th August 2022

Funding from EU: 4.97 M€

Total cost: 5.3 M€

BIO-BASED INDUSTRIES Public-Private Partnership

Horizon 2020 European Union funding for Research & Innovation

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Partnership

Participant No	Participant organisation name	Participant short name	Country	Type
1 (CO)	Fachhochschule Nordwestschweiz	FHNW	Switzerland	RTD
2	Alma Mater Studiorum – Università degli Studi di Bologna	UNIBO	Italy	RTD-associated BBI member
3	Innovacio i Recerca Industrial i Sostenible SL	IRIS	Spain	SME
4	Università degli Studi di Parma	UNIPR	Italy	RTD
5	Stazione Sperimentale per l'Industria delle Conserve Alimentari	SSICA	Italy	RTD
6	Celabor scrl	CELAB	Belgium	SME-Full BIC member
7	Institut für Getreideverarbeitung GmbH	IGV	Germany	SME
8	Stolzenberger Bakerei	SB	Germany	SME
9	Bio Base Europe Pilot Plant vzw	BBEPP	Belgium	SME-associated BBI member
10	Conserves France	CONS	France	Large
11	RTD TALOS Ltd.	TALOS	Cyprus	SME
12	COSMETIC	COSM	Greece	SME
13	illycaffè S.p.A.	ILLY	Italy	Large
14	Nutrition Sciences N.V.	NS	Belgium	Large
15	Pleurette SAS	PLEUR	France	SME
16	FEMTO Engineering S.r.L.	FEMTO	Italy	SME
17	Innovacoop S.r.L.	INNOV	Italy	SME

17 partners from 7 EU countries (Belgium, Cyprus, France, Germany, Greece, Italy, Spain) **and 1 Associated country** (Switzerland)

of which:
4 RTD
10 SMEs
3 Large Companies

Horizon 2020 European Union funding for Research & Innovation
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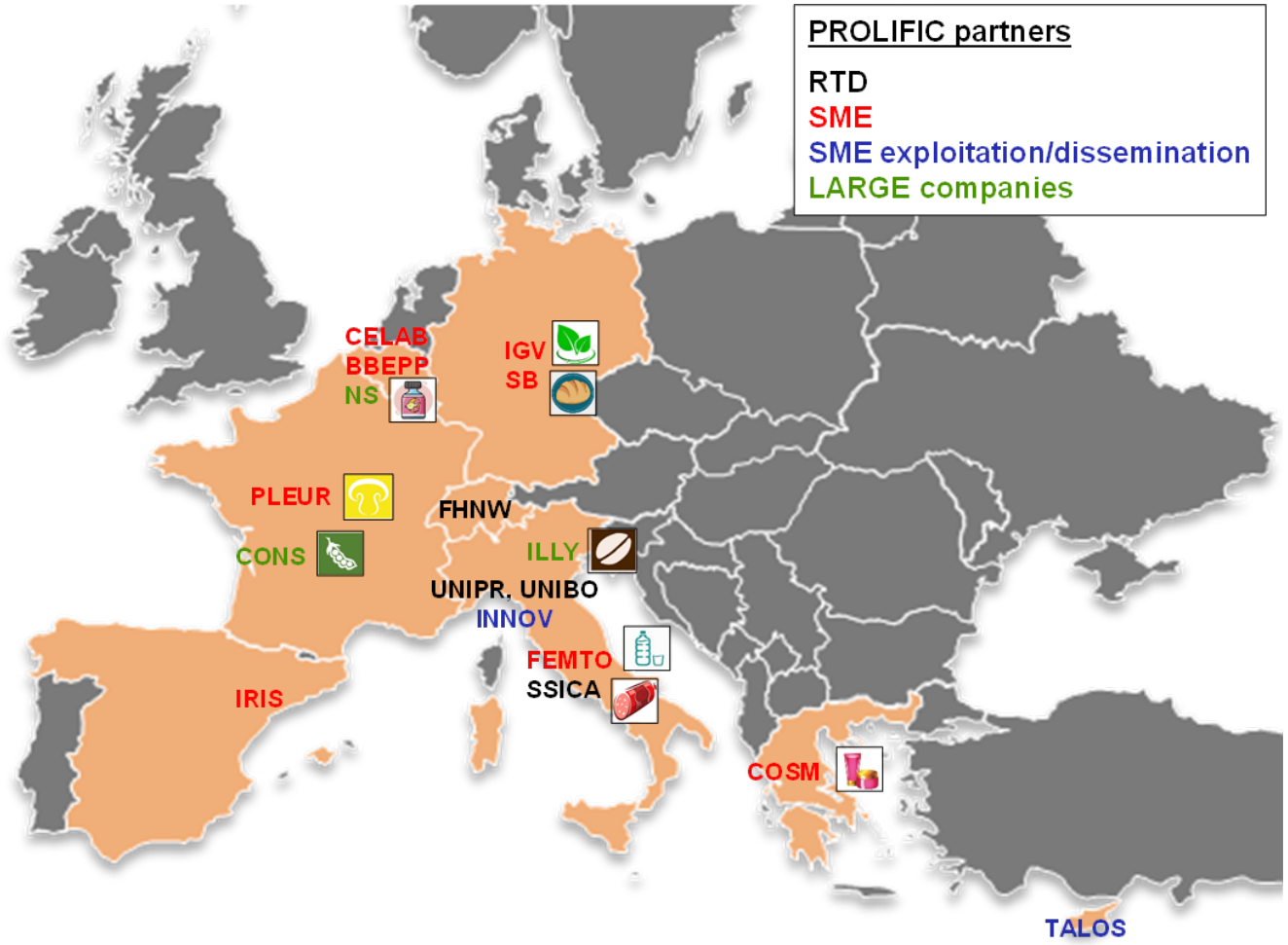

FEEDSTOCKS

- Legume provider
- Fungi provider
- Coffee provider

FINAL PRODUCTS

- **Food** – Cereal-based
- **Food** – Vegetarian and vegan
- **Food** – Meat
- **Cosmetic** – creams, toothpaste
- **Packaging** – coating for dry meat, packaging for meat and cosmetics, coffee capsules
- **Feed** – pigs and poultry

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During PROLIFIC

- A flexible, integrated and fully scalable at industrial level cascading approach to extract and/or convert PROTEINS, peptides and amino acids, and a wide array of other bioactive molecules (cellulose/hemicellulose, chitosan, b-glucans, polyphenols, carotenoids, phytosterols, caffeine) from the three selected biomass processing residues, will be developed

- At least five completely new bio-based value chains will be set up

- Depending on final applications, TRL will progress from 3-4 up to 5-8

- At least 16 product prototypes will be produced and validated at industrial level in 4 different industrial fields **(food, feed, cosmetic, polymers/packaging).**

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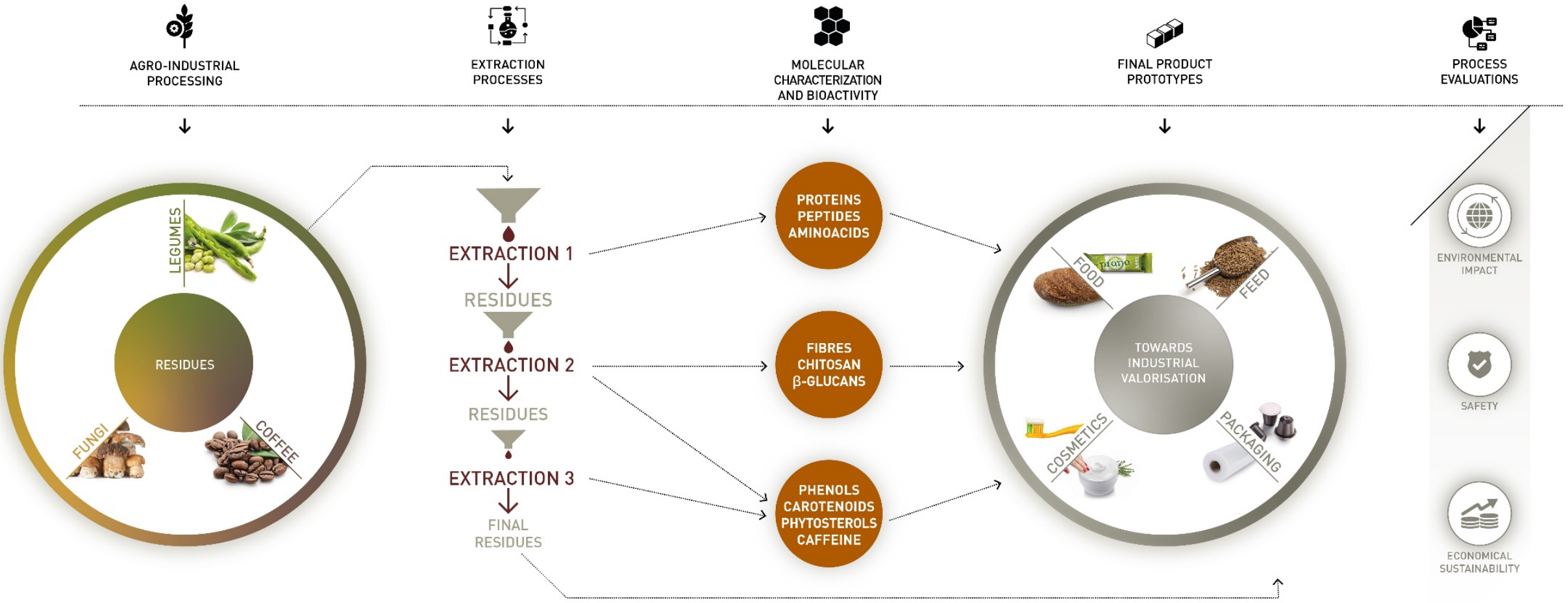
Project idea



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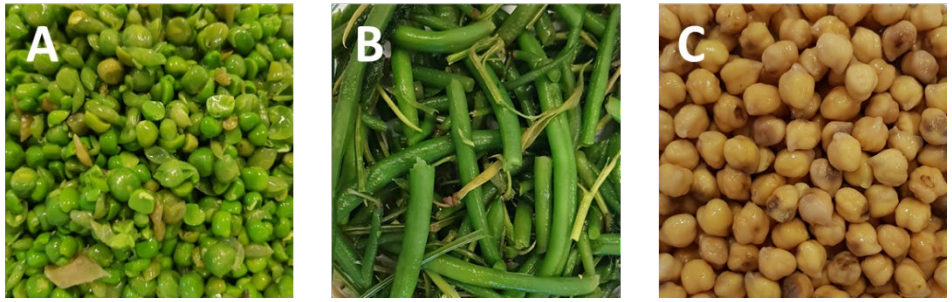
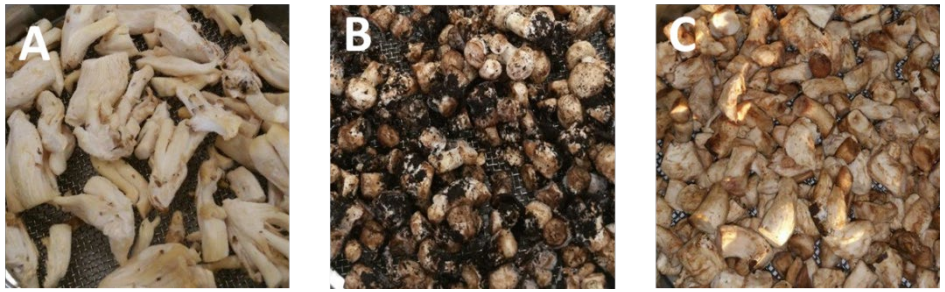
Type of feedstocks



LEGUMES (from CONSERVES FRANCE/ITALY)

- Non compliant: fresh seeds of peas, fresh greenbeans, rehydrated chickpeas



FUNGI (from PLEURETTE)

- Processing cuttings, left overs and mycelium of Agaricus bisporus, Pleurotus ostreatus, Lentinus edodes

COFFEE (from ILLY)

- Silver skin and non compliant coffee seeds

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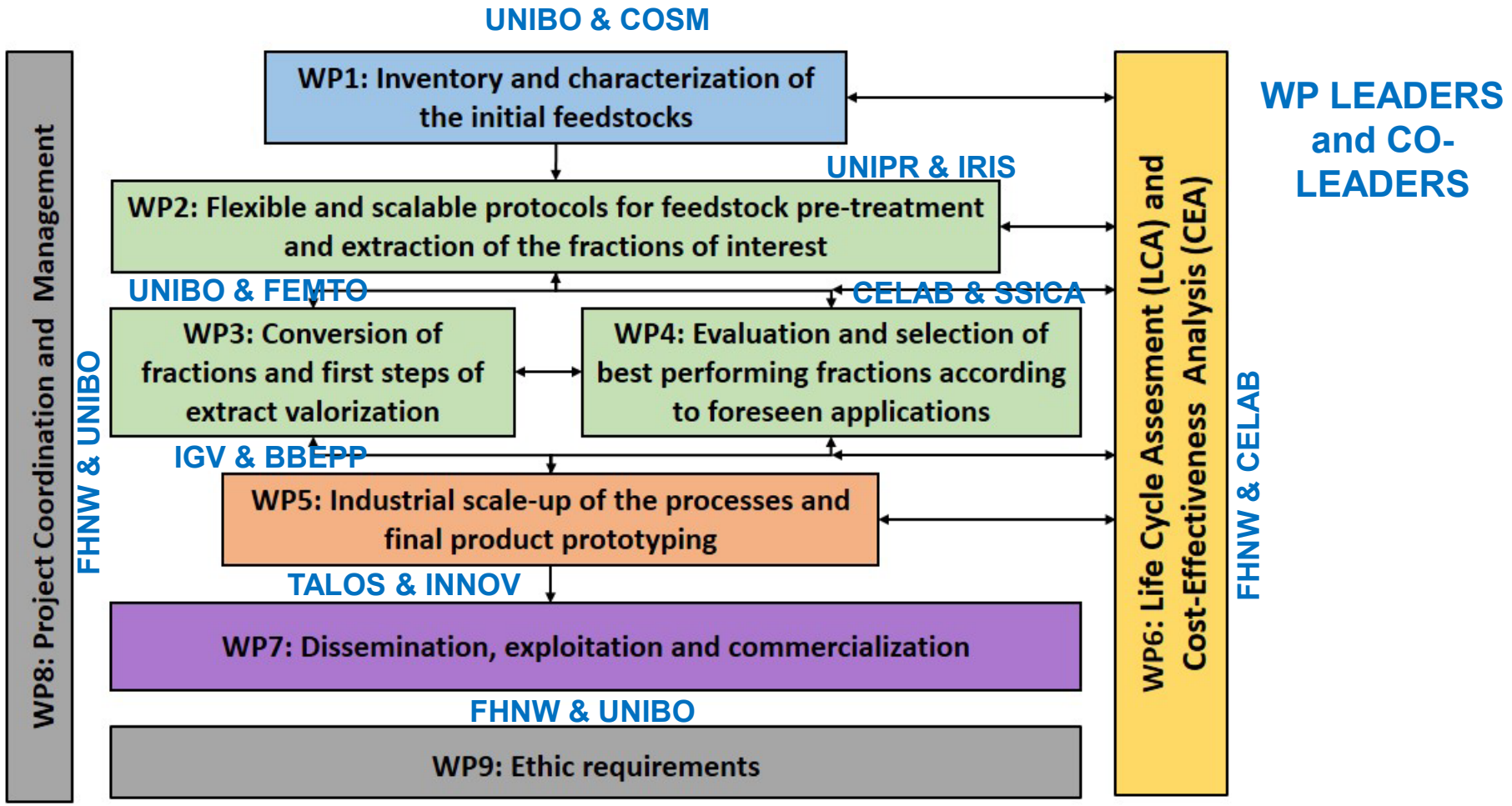
PERT scheme



WP LEADERS and CO-LEADERS

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PROLIFIC is actually at Month 12

PROLIFIC		DURATION - DELIVERABLES - MILESTONES																																														
		1st year												2nd year												3rd year												4th year											
	DESCRIPTION OF WORK PACKAGES AND TASKS	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	41	42	43	44	45	46	47	48
WP1: Inventory and characterization of the initial feedstocks								M																																									
Task 1.1	Inventory, availability and sustainability of selected feedstocks					D																																											
Task 1.2	State of the art on processing technology and valorization review. Specification requirements on target compounds by producers/end-users and compliance with existing regulations							D/D																																									
Task 1.3	Molecular and safety characterization of initial feedstocks						D																																										
WP2: Flexible and scalable protocols for feedstock pre-treatment and extraction of the fractions of interest																M			M																														
Task 2.1	Pre-treatent, protein extraction, fractionation and characterization																		D/D																														
Task 2.2	Recovery of valuable non protein compounds from residual solid fibre-rich fractions																					D																											
WP3: Conversion of fractions and first step of extracts valorization																			M/M																		M												
Task 3.1	Concentration and further fractionation of extracts																		D																														
Task 3.2	Biochemical/biocatalytic conversion of protein extracts																		D																														
Task 3.3	Stabilization of extracts																								D																								
Task 3.4	Utilization of extracted bioactive fractions and extraction residues in polymer formulation for packaging																																				D												
WP4: Evaluation and selection of the best performing isolated fractions according to foreseen applications																																	M		M/M						M								
Task 4.1	Safety compliance of the extracts																																		D														
Task 4.2	Fraction selection for food																																				D												
Task 4.3	Fraction selection for cosmetics																																				D												
Task 4.4	Selection of formulations for polymers and composites for packaging																																													D		
Task 4.5	Fraction selection for feed																																				D												
WP5: Industrial scale up of the processes and final product prototyping																																							M								M		
Task 5.1	Set up of scale up processes for the production of selected fractions																																						D										
Task 5.2	Food products prototyping																																													D		
Task 5.3	Cosmetics formulation and prototyping																																													D		
Task 5.4	Prototyping of polymers and composites based formula for packaging																																													D		
Task 5.5	Feed products prototyping																																													D		
WP6: Life-Cycle Assessment (LCA) and Cost-Effectiveness Analysis (CEA)																			M																											M		
Task 6.1	Products selection, data collection and estimations																		D																														
Task 6.2	Feasibility assessment for LCA and CEA analysis																																													D		
Task 6.3	Life-Cycle Assessment (LCA) of the foreseen products and technologies																		D																											D		
Task 6.4	Cost-Effectiveness Analysis (CEA) of the foreseen products and technologies																		D																											D		
Task 6.5	Review of regulations for the foreseen products																																								D								
WP7: Dissemination, exploitation and commercialisation						M																																											M
Task 7.1	Developing dissemination strategy and action plan					D																																											
Task 7.2	Dissemination and networking activities						D																		D																								D
Task 7.3	Communication activities																								D																								D
Task 7.4	IPR and exploitation activities																								D																								D/D
Task 7.5	Data Management Plan (DMP)						D																																										
WP8: Project coordination and mangement																																																	
Task 8.1	Coordination, project meetings and reporting		D																																														
Task 8.2	Overall legal and contractual management																																																
Task 8.3	Financial and administrative managment																																																
Task 8.4	Coordination of knowledge and innovation managment activities																																																
WP9: Ethic requirements																																																	
Task 9.1	Ethic requirements related to the environment and research health and safety procedures		D																																														
Task 9.2	Ethic requirements related to humans						D/D																																										
Task 9.3	Ethic requirements related to animals						D																																										
		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	41	42	43	44	45	46	47	48
		1st year												2nd year												3rd year												4th year											

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BIO-BASED INDUSTRIES

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Main objectives - 1

- *Map the availability and sustainability of the selected feedstocks (legumes, fungi and coffee residues) during and after the project (WP1).*

- *Define the specifications and compliance with existing regulations of residue derived compounds (WP1, WP5, WP6 and WP7).*

- *Set up of flexible and fully industrially scalable biorefinery extraction protocols for the isolation of proteins and bioactive compounds from plant residues (WP2, WP4 and WP5).*

- *Convert the extracted fractions into valuable ingredients to specific final applications tailored to the needs of industrial end-users (WP3 and WP5).*

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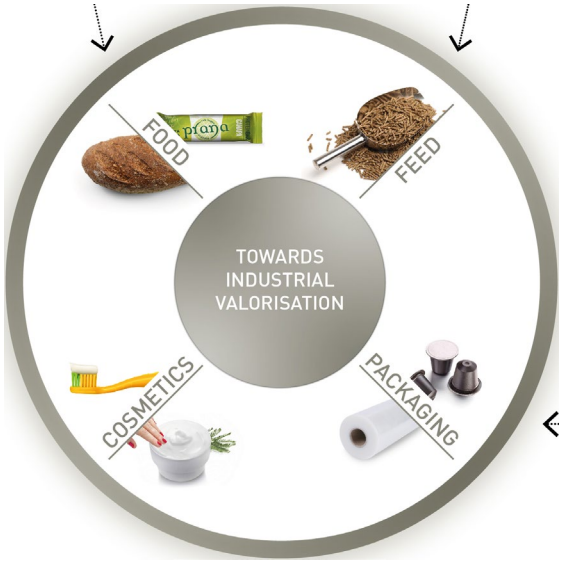
Main objectives - 2

- ***Select, validate and demonstrate the use of extracted/converted fractions as ingredients in the food sector (WP4 and WP5).***

at least 8 food product prototypes (cereal-based, vegetarian/vegan, meat-based) will be produced, validated and subjected to sensory evaluation and/or consumer acceptability panels in order to evaluate their marketability



- ***Select, validate and demonstrate the use of extracted/converted fractions as ingredients in cosmetic sector (WP4 and WP5).***

at least 2 cosmetic product prototypes (creams and toothpaste) with improved functionalities will be produced and validated.

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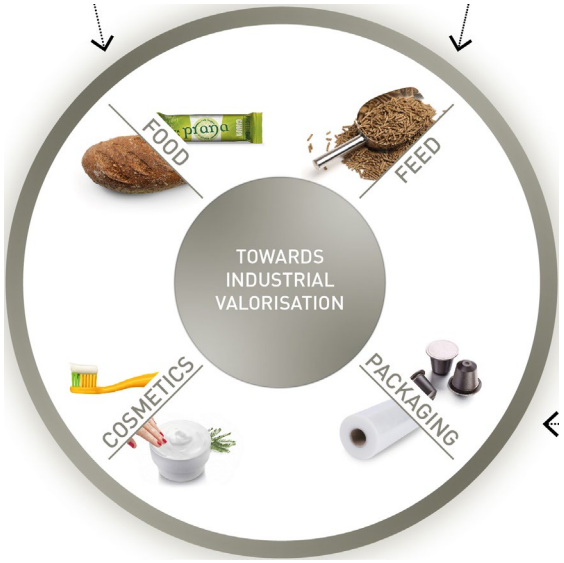
Main objectives - 3

- ***Select, validate and demonstrate the use of extracted/converted fractions as ingredients in the animal <u>feed</u> sector (WP4 and WP5).***

at least 2 feed product prototypes will be produced and validated (with improved functional properties and/or nutritional values) for pigs and poultry.



- ***Select, validate and demonstrate the use of extracted/converted fractions as ingredients/additives in <u>packaging</u> sector (WP4 and WP5)***.

at least 4 bioactive and/or biodegradable packaging prototypes for food and cosmetics **among which: meat coating, biodegradable and bioactive coffee capsules, bioactive cosmetic packaging, biocomposites,** will be produced and validated.

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Main objectives - 4

- ***Demonstrate the safety & regulatory compliance, as well as the environmental & financial sustainability of the developed processes and products (WP6).***

Life Cycle Analysis and Cost-Effectiveness Analyses will be performed starting from the very beginning of the project through the entire duration of the project

- ***Successfully disseminate the project results and foster their efficient exploitation (WP7).***

2 specialised workshops will be organised by partners (on packaging and food applications)

Create exploitation roadmap consolidating commercialisation plans and business opportunities towards successful market entry of the products

Networking with a large number of European cooperatives and cooperative enterprise associations gathering various producers of biomass, to attract maximize impact and exploitation possibilities.

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PROLIFIC: first results

- Biomass availability, amounts and logistic have been assessed
- Compliance of foreseen protocols/products with existing regulations has been assessed
- All feedstocks have been analysed for their molecular composition and for the abscence/presence of biological or chemical contaminations
- At leat 3 different extraction protocols are being tested for each feedstock and first protein and fiber extracts were obtained and are under characterization

Protein extracts (SSICA)

Fiber extracts (SSICA)

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PROLIFIC's partners

PROLIFIC

Fachhochschule Nordwestschweiz

IRIS TECHNOLOGY GROUP

UNIVERSITÀ DI PARMA

SSICA
STAZIONE SPERIMENTALE PER L'INDUSTRIA DELLE CONSERVE ALIMENTARI

IGV

Bäckerei Steinel Stolzenberger
Bönnigheim • Poststr. 1 • Tel.(07143)23381

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celabor

Pleurette

nutrition sciences

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INNOVA COOP
Sviluppo cooperativo

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 **ProlificH2020**

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PROLIFIC is member of the BIOREFINE CLUSTER EUROPE