Biorefineries for the valorisation of macroalgal residual biomass and legume processing by-products to obtain new protein value chains for high-value food and feed applications

Project number: 887259

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PROJECT INFORMATION

Project full title: Biorefineries for the valorization of macroalgal residual biomass and legume processing by-products to obtain new protein value chains for high-value food and feed applications

Acronym: ALEHOOP

Call: H2020-BBI-JTI-2019

Topic: BBI-2019-SO3-D3

Start date: June 1st 2020

Duration: 48 months

List of participants:

Partner no.	Type of partner	Name	Acronym	Country
1 (Coordinator)	SME	Contactica	CTA	Spain
2	SME	Isanatur	ISA	Spain
3	SME	Biozoon	BZN	Germany
4	SME	Biosurya	BIOYA	Spain
5	SME	Centiv	CENTIV	Germany
6	SME	Garlan	GARLAN	Spain
7	SME	Alginor	ALGI	Norway
8	LE	Nuscience	NUS	Belgium
9	LE	Indukern	IK	Spain
10	RTO	The Flanders Research Institute for agriculture, fisheries and food	EV-ILVO	Belgium
11	RTO	Anfaco	ANFACO	Spain
12	RTO	Tecnalia	TECNA	Spain
13	RTO	Technological University Dublin	TUDublin	Ireland
14	RTO	Universidad de Cádiz	UCA	Spain
15	RTO	Veterinary Research Institute	VRI	Czech Republic
16	RTO	Universidad de Vigo	UVIGO	Spain

DELIVERABLE DETAILS

Document Number:	D8.5
Document Title:	Report on the contribution to standardization (Part I)
Dissemination level	Confidential, only for members of the consortium (including the Commission Services).
Period:	PR 2
WP:	WP 8. Regulatory and market access aspects
Task:	Task 8.3. Standardization activities
Author:	
Abstract:	ALEHOOP D8.5 is produced in the context of WP8, Task 8.3 – *Standardization activities.* The purpose of this report is to update the consortium on the activities to date, that have contributed to this task. These activities include communications with the consortium, the Spanish Association for Standardization (UNE), who are subcontracted to the ALEHOOP project to provide support regarding the standardization tasks included in the project, and communication with relevant technical committees. An overview of the actions commenced to date and the outcomes are provided, along with a schedule of planned activities for the next reporting period.

LIST OF ABBREVIATIONS

AFNOR	Association Française de Normalisation
CEN	European Committee for Standardization
INSO	Iran National Standards Organization
ISO	International Standards Organisation
NEN	Nederlands Normalisatie-instituut
SAC	Standardization Administration of China
SC	Subcommittee
TC	Technical committee
TR	Technical Report
UNE	Spanish Association for Standardization
WG	Working group

1 INTRODUCTION

The standardization system is combines technical committees, subcommittees, working groups, standards and technical documents covering a vast number of subjects. In order to contextualize and manage the process for ALEHOOP, the relevant committees and documents were identified in Deliverable 8.4 which related to the ALEHOOP research activities. They were characterized by categories as pertaining to the research activities, and the relevant work packages and partners were identified with them.

Table 1 Key technical committees identified in D7.4 for future activities

Technical Committee	Subject area	Work Packages	Secretariat
CEN/TC 454 - Algae and algae products	Specification, classification, terminology and determination methods for algae	WP 2	NEN
CEN/TC 327 - Animal feeding stuffs	Methods for sampling and analysis – chemical, biochemical, microbiological, physical	WP 2, 6	NEN
ISO/TC 34/SC 10 - Animal feeding stuffs	Terminology, sampling, methods of test and analysis in quality control	WP 2, 6	INSO
CEN/TC 411 - Bio-based products	Sampling, certification tools, bio-based content	WP 4	NEN
ISO/TC 34/SC 4 - Cereals and pulses	Terminology, sampling, methods of test and analysis, product specifications and requirements for packaging,	WP 3, 7	SAC

Several gaps were identified in the availability of standards related to ALEHOOP activities, particularly with regard to the extraction, downstream processing, and characterization of proteins from macroalgal or legume biomass. There are also no technical committees for development of standards on algae at the ISO level, nor is there any development of standards for legumes at the European level.

A strategy was outlined with the support of, the Spanish Association for Standardization (UNE), who are subcontracted by TU Dublin, to make the interaction with the standardization system be most effective, efficient and fruitful as possible, through the definition of several actions including:

- Follow up on standardization activities related to ALEHOOP through updates from UNE;
- Communication and collaboration with existing standardization technical committees and organizations:
    - Identify and contact the standardization technical committees which can have a stronger link with the project;
    - Participation of one or more ALEHOOP partners in ongoing works of some technical committees;
    - Dissemination of the ALEHOOP progress by reporting to the relevant technical committees or attending the relevant technical committee meetings.

Deliverable 8.4 was submitted to the consortium in September 2021, M16. At the 3rd General Assembly, a brief summary of the deliverable was presented to the consortium along with an overview of the planned activities for the contribution to standardization. The partners were informed that a survey would be sent out following

the General Assembly in order to gather information that was required to define the strategy and identify the project needs and potential avenues for standardization.

2 STRATEGY

The Project's outcomes with potential to be standardized will be identified by UNE, together with the partners. The best standardization track for each outcome will be defined by UNE and with this information, decisions will be taken about the next steps together with the partners. These actions may include:

- Proposal for, and participation in modification of existing standard(s).
- Proposal and development of new standardization document(s), such as CEN Workshop Agreement (CWA), CEN or ISO Technical Specifications (TS) or Technical Reports (TR). CWA is usually the best suited option for R&I projects.

2.1 What actions are to be taken

The actions required to progress the standardization activities for ALEHOOP can be broadly discussed under two categories:

A. Those carried out directly within the standardization system. These are the activities facilitated by TU Dublin and supported by UNE;
B. Those performed within the consortium as support for the above (A). These correspond to specific needs identified during the project development.

With respect to the specific actions that can progress the contribution to standardization and the subsequent development of deliverable 8.6, several potential activities have been defined:

1. The follow up of the standardization activity through updates reported by UNE. This would include updates to ongoing projects within TCs and WGs, revisions to relevant standards. This information can be included as updates to Deliverable 8.4.
2. WP 8 meetings organized by TU Dublin. These meetings will facilitate the identification of project needs, and the sharing of relevant information or project findings, between the partners and UNE, in order to support the progression of the standardization activities.
3. Introduction of the ALEHOOP project to the relevant committees (see Annex C) and requesting feedback or a meeting where applicable.
4. Facilitating the follow up through joining and participation of on ore more ALEHOOP partners to a standardization committee. As standardization is an open process, all interested parties may participate in a CEN/ISO TC through its National Standardization Body.
5. The establishment of a Project Liaison with a TC. Under this figure, the consortium could participate as an entity in the TC (without voting rights). This action would only be advisable when the TC is developing a related standard during the life of the project.

Depending on the assessment by the ALEHOOP partners, along with UNE, of the impact of the identified technical committees on their tasks, and the level of contribution that their results can represent for these committees, several activities can be performed by the consortium partners, including:

1. Contributing to working groups or standards under development.
2. Contributing feedback or modifications on existing standards employed by the ALEHOOP partners.
3. Requesting information from TCs. E.g., general or specific questions put to the TCs regarding ALEHOOP activities or possibilities for standards.
4. Contribute findings / outcomes to relevant technical committees to contribute new knowledge for the development or modification of new/existing standards or documents
    - *E.g., Methodology to perform the LCA of protein concentrates from bio-mass*
    - *E.g., Methodology for the extraction / biorefinery of proteins from algae / legumes*
5. Identifying gaps in the standardization landscape, as relevant to ALEHOOP activities, and contributing proposals for the development of new standards relevant to the activities and outcomes of ALEHOOP
    - *Life-cycle assessment with specific regard to the food production sectors*
        - *Social Life-cycle assessment*
        - *Life-cycle costing*
    - *Standard specifications for algae-derived protein ingredients*
        - *Limits for contaminants*
        - *Methods of analysis i.e., chemical composition*
        - *Extraction / production methodology*
    - *Standard specifications for legume-derived protein ingredients*
    - *Toxicity analysis with respect to food extracts i.e., mutagenicity, genotoxicity, cytotoxicity.*

2.2 Which committees can be contacted

Deliverable 8.4 presented the landscape of both European and International technical committees which are relevant to the ALEHOOP project activities. The following working groups / subcommittees have been identified with active work programmes related to the ALEHOOP activities.

European Committee for Standardization, CEN

- ISO/TC 34/SC 4/WG 6 – Pulses
- ISO/TC 34/SC 20 – Food loss and waste
- ISO/TC 34/WG 14 – Vitamins, carotenoids and other nutrients
- ISO/TC 34/WG 21 – Social responsibility/sustainability
- ISO/TC 34/WG 26 – Plant-based foods
- ISO/TC 207 – Environmental Management
- ISO/TC 323 – Circular economy

International Standards Organization, ISO

- ISO/TC 34/SC 4/WG 6 – Pulses
- ISO/TC 34/SC 20 – Food loss and waste
- ISO/TC 34/WG 14 – Vitamins, carotenoids and other nutrients
- ISO/TC 34/WG 21 – Social responsibility/sustainability
- ISO/TC 34/WG 26 – Plant-based foods
- ISO/TC 207 – Environmental Management
- ISO/TC 323 – Circular economy

2.2.1 Ongoing projects related to the ALEHOOP activities

Several relevant documents have been initially identified as related to some ALEHOOP activities

CEN/TC 275:

- prEN 17851 (WI=00275368) Analysis of Foodstuffs - Determination of Ag, As, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Se, Tl, U and Zn in foodstuffs by inductively coupled plasma mass spectrometry (ICP-MS) after pressure digestion
- prEN 13806 rev (WI=00275373) Determination of mercury by atomic fluorescence spectrometry (AFS) - cold vapour technique after pressure digestion
- prEN 13806 rev (WI=00275375) Foodstuffs - Determination of trace elements - Determination of mercury by cold-vapour atomic absorption spectrometry (CVAAS) after pressure digestion
- prEN 13806 rev (WI=00275374) Determination of mercury in food with atomic absorption directly from the foodstuff (elemental mercury analysis)

CEN/TC 327

- prEN ISO 30024 rev (WI=00327128) Animal feeding stuffs - Determination of phytase activity

CEN/TC 411

- prEN 16785-1 rev (WI=00411018) Bio-based products - Bio-based content - Part 1: Determination of the bio-based content using the radiocarbon analysis and elemental analysis

CEN/TC 454

- (WI=00454004) Algae and algae-based products or intermediates – Methods of sampling and analysis - Determination of total lipids using the Ryckebosch-Foubert method
- FprCEN/TR 17559 (WI=00454011) Algae and algae products - Food and feed applications: General overview of limits, procedures and analytical methods

3 ACTIONS AND OUTCOMES

Table 2: Summary of actions carried out between M12 and M24

Action	Date	Description	Outcome
Information request to the partners	Aug 2021 (M15)	Excel file sent out to all partners to gather initial information regarding methods / standards being employed by the partners and any requests they had for standards. This information was collected to direct the standardization landscape for the project.	During the filling period, 10 partners answered the questions with varying levels of detail.
Deliverable 8.4	Sept 2021 (M16)	A report on the standardization landscape as relevant to ALEHOOP was prepared. This collected existing standards, lists of technical committees and working groups relevant to the project, an outline of potential standardization activities.	Submission of Deliverable 8.4
First project meeting with UNE	Nov 2021 (M18)	Kick-off meeting with UNE, following contract signing, to introduce ourselves and discuss a broad strategy for the projects.	Agreed a strategic overview and outline of activities planned for M20 - M36.
Information request to the partners	Jan 2022 (M20)	A questionnaire was sent out to all partners to gather general information about standards being used, standardization needs, participation and information on possible future new standards.	During the filling period, 6 partners answered the questions with different levels of detail according their use or knowledge of standards.
Project meeting with UNE	Feb 2022 (M21)	Meeting with UNE to discuss the information required to introduce the project to the relevant technical committees.	Agreed on a presentation to prepare to introduce the project to the relevant TCs.
Project meeting with UNE	April 2022 (M23)	Meeting with UNE to discuss the material for dissemination to the TCs and the options available to the consortium for interaction with standardization system.	Finalised the presentations for initial communication with the TCs. It was agreed that TU Dublin would commence WP 8 meetings with individual partners and Elena would attend. It was agreed that first communication with TCs would follow initial WP 8 meetings.
WP 8 meetings	June 2022 (M25)	WP 8 meetings are scheduled to commence in June, 2022, M25. These will be individual partner meetings with TU Dublin and our UNE representative. These meetings will seek to gather information that can be relevant for communications with TCs, i.e., feedback on existing standards, projects, or gaps in standards. We will also discuss what potential standardization activities are applicable to the relevant WPs / tasks.	Scheduled to commence M25, June 2022.

4 Schedule of activities

The schedule of activities is dependent on the outcome of the planned WP meetings. A summary of the possible dissemination actions is presented in Table 3

Table 3: Summary of possible dissemination activities.

Action	Responsible
Follow up of TCs standardization activities	TU Dublin
Presentation of project to TCs	TU Dublin
Participation in a TC	TU Dublin, Partners
Providing feedback on existing standards	Partners
Delivering reports to TCs	TU Dublin
Information requests to TCs	TU Dublin, Partners

5 Conclusions

During the period M12-M24, the standardization landscape was prepared and communicated to all partners and the planned activities were discussed at the ALEHOOP General Assembly in M19. The contract with the Spanish Association for Standardization, UNE, was secured and communications commenced via online meetings.

Deliverable 8.5 is the first report on the contribution to standardization, due for submission in month 24. The activities which contribute to this deliverable are highly dependent on the findings and deliverables which are generated by the other WPs in ALEHOOP.

The roadmap for standardization is reliant on the information provided by the project partners, in order to identify the project needs. The survey on standardization (see Annex A) was disseminated with the aim to gather information from the partners, that could be useful for the standardization technical committees, and thus, serve as a mean to approach them. For this reason, the survey was designed to obtain information on specific standards that are in use by the project, or aspects that could be standardized, and to be used as a link between technical committees and ALEHOOP partners. Six partners participated in completing the questionnaire, however, little information has been provided regarding their use of standards or future standardization proposals, which is required for approaching committees.

As a result of this, the need for dedicated WP 8 meetings was identified. TU Dublin will facilitate these meetings between UNE and the consortium (on an individual partner basis). Information will be provided on how the partners can get involved in standardization, focusing on the ALEHOOP project needs, and how it can benefit the partners and the consortium as a whole. Following these meetings, TU Dublin will be better positioned to identify the most relevant ongoing projects within CEN and ISO that the partners could contribute feedback to. The first WP meeting has been scheduled for June 15th with Uvigo.

After the WP meetings have commenced, the presentation for the TCs (see Annex B) will be updated and disseminated to the committees / working groups which are identified as being the most relevant. A more detailed roadmap for standardization can be defined and Deliverable 8.5 can be updated in due course.

ANNEX A: Partner Questionnaire

WP: WP 8. REGULATORY AND MARKET ACCESS ASPECTS

TASK: TASK 8.3. STANDARDIZATION ACTIVITIES

AUTHOR: KIM A. MILLAR, KIM.MILLAR@TUDUBLIN.IE

PARTNER: Click or tap here to enter text.

1. Is your ALEHOOP task affected by any European legislation (Directives, regulations...)?
   Please refer to Deliverable 8.2 for this.

   YES ☒ **Alginor, Biozoon, Uvigo, VRI**

   NO ☒ **Contactica, El ILVO**

   If yes, please list the relevant legislation.

Alginor	REGULATION (EC) No 178/2002; REGULATION (EC) No 183/2005; REGULATION (EC) No 852/2004; DIRECTIVE 2008/98/EC; REGULATION (EC) No 1925/2006 and COMMISSION IMPLEMENTING REGULATION (EU) No 307/2012/COMMISSION IMPLEMENTING REGULATION (EU) No 489/2012, COMMISSION REGULATION (EU) No 1161/2011, COMMISSION REGULATION (EC) No 1170/2009; COMMISSION REGULATION (EC) No 1881/2006; COMMISSION REGULATION (EU) No 165/2010, COMMISSION REGULATION (EU) 2015/1006, REGULATION (EC) NO 396/2005, COMMISSION REGULATION (EC) No 149/2008, DIRECTIVE 2002/32/EC; COMMISSION REGULATION (EU) No 574/2011; DIRECTIVE 2009/39/EC; COMMISSION DIRECTIVE 1999/21/EC; COMMISSION REGULATION (EC) No 41/2009; COMMISSION REGULATION (EC) No 953/2009; COMMISSION DIRECTIVE 1999/21/EC; REGULATION (EC) No 1924/2006; COMMISSION REGULATION (EC) No 353/2008; COMMISSION REGULATION (EC) No 1169/2009; REGULATION (EU) No 1169/2011; (EC) No 1925/2006; COMMISSION REGULATION (EU) No 1047/2012; REGULATION (EU) 2015/2283; COMMISSION IMPLEMENTING REGULATION (EU) 2017/2469; COMMISSION IMPLEMENTING REGULATION (EU) 2020/1772; REGULATION (EU) No 609/2013; REGULATION (EC) No 1831/2003; COMMISSION REGULATION (EC) No 429/2008
Biozoon	Reg. (EC) No. 852/2004, CR (EC) No 2023/2006, Reg. 8EC) No. 1925/2006, Reg. (EC) 1924/2006, Reg. (EU) No 1169/2011, Reg. (EU) 2283/2015, Reg. (EU) No 609/2013

Uvigo	Directive 2010/63/EU revising Directive 86/609/EEC on the protection of animals used for scientific purposes
VRI	Council Directive 98/58 / EC of 20 July 1998 concerning the protection of animals kept for farming purposes, as amended by Council Regulation (EC) No 806/2003 and Regulation (EU) 2017/625 of the European Parliament and of the Council. Directive 2010/63 / EU of the European Parliament and of the Council of 22 September 2010 on the protection of animals used for scientific purposes.

2. Is your organisation participating in any **standardization technical committees (TC)**, **working groups** or similar (National, European, or International, ISO, CEN, etc.,), already identified in Deliverable D8.4?

   YES ☐

   NO ☒ **Alginor, Biozoon, Contactica, EL ILVO, Uvigo, VRI**

   a. If yes, please specify the technical committee, working group or similar, in which your organisation is participating:
   Click or tap here to enter text.

   b. If no, please identify which committees or working groups you could potentially contribute to?:
   Click or tap here to enter text.

3. Within the framework of the ALEHOOP project is your organisation using European or International standards (or other European documents) among those identified in Deliverable D8.4?

   YES ☒ **Alginor, Contactica, EL ILVO, Uvigo, VRI**

   NO ☒ **Biozoon**

   a. If yes, specify what standards/documents you are using and provide feedback on these standards.

Alginor	Analytical methods and quality control: ISO 17025:2017 (Microbiological assessment), EN 13654-1 (Protein content), DIN EN ISO 11885:2009-09 (Heavy Metal content), DIN-EN 13037:2011 (pH), DIN-EN 13040:2008 (Moisture content), ISO 9001 (Protein Content). There might be more that will be used in future depending on the final ingredient, application area and required documentation
Contactica	ISO 14040, ISO 14044: They are the general and basic guidelines for carrying out LCA of products.
EL ILVO	BELAC certified no. 033-TEST ISO 17025 Several internal methods for the analysis of food (>80 accredited) see list https://ilvo.vlaanderen.be/uploads/migration/public/Diensten/Brochure_services_TV.pdf use for legal requirements

Uvigo	ISO9001:2015; Scientific and technologic support services in the biomedical field in Bio experimentation [(housing and breeding of laboratory animals (rat-mouse), performance of experimental procedures)]
VRI	If needed, in vivo experiments could be used under GLP as VRI is the holder of the Certificate of Good Laboratory Practice based on Act No 378/2007 Coll., on Pharmaceuticals and on Amendments to some related acts (Act on Pharmaceuticals)

4. What aspect of your task do you think should be standardised (ingredient specifications, selection criteria, processing & downstream processing etc.) to facilitate production, safety requirements and market acceptance?

   YES ☒ **Alginor, Uvigo, VRI**

   NO ☒ **Biozoon, Contactica, EL ILVO**

   a. If yes, please give details.

Alginor	Standard specifications for algae-derived protein ingredients and/or limits for contaminants in algae-derived protein ingredients might increase the market acceptance
Uvigo	To provide standardized methods to analyse the chemical composition of the algae-derived ingredients. For example, for the particular case of N content determination by means of Kjeldahl method, there is no agreement on the protein conversion factor yet.
VRI	Because the product will be intended for supplementation of animal feed, it will have to meet at least the standards defining contents of heavy metals and toxins, both bacterial and fungal.

5. What deliverables or findings from your ALEHOOP task would be relevant for the development of new standards?

Contactica	Deliverables 4.1 and 4.2 to establish a Methodology to perform the LCA of protein concentrates from bio-mass.

6. In order to upscale and market your ALEHOOP ingredients for the marine / agri-food industries in the future, would a standard/document in common with the rest of this industry, or other sectors (European or world-wide) be useful?

   YES ☒ **Alginor, Biozoon, EL ILVO, VRI**

   NO ☒ **Contactica**

   a. Please specify what type of standards and how this would be useful.

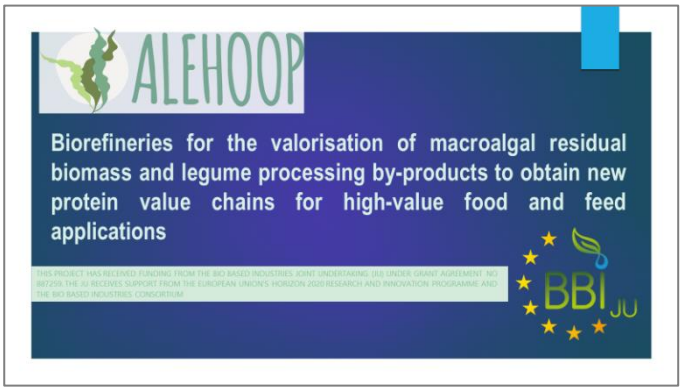
Alginor	Potentially yes, but at the moment the process and final product/ingredient is not fully defined.

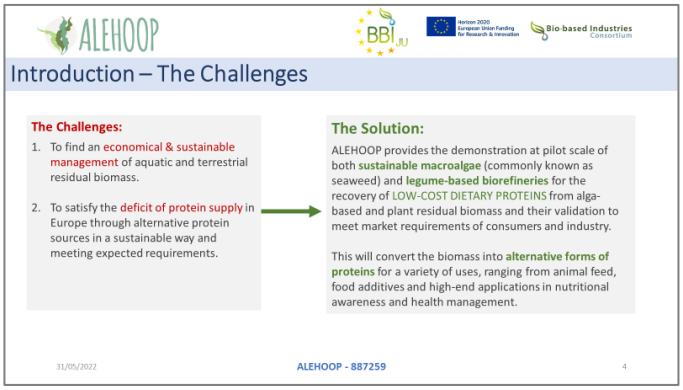
Biozoon	Standardised Information, applications.
EL ILVO	To provide a certain quality of the upscaled product
VRI	Probably yes. I can imagine process of algae production?

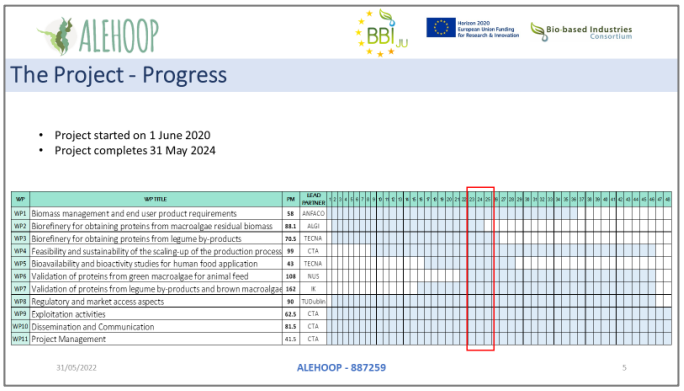
7. Please add here any other information regarding your task/deliverables and standardization that you may deem relevant.

Alginor	Alginor Group is working on systematization and standardization of procedures, processes, checklists etc. We are relative certain on certification of our production facilities, but regarding the product development (algae-derived food or feed ingredient) it is difficult to find specific regulations and to identify applicable specifications/limits for certain contaminants. Different regulations apply in different EU countries (e.g. dietary supplements in France). As any new algae derived product needs to be novel food registered in the EU more specific data on the requirements/specifications could be helpful.
Contactica	There is an open process to develop a Product Category Rule (document used to set the rules for the LCA of certain products category) with Environdec (program operator), If an LCA is developed under these rules (once approved) and accepted by the program operator, industry could obtain an Environmental Product Declaration (EPD) to communicate the life cycle environmental impacts of their products.

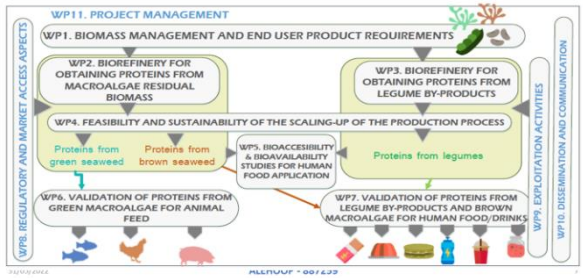
ANNEX B: ALEHHOP General Presentation for ISO and CEN technical committees







The Project – The Workplan



The Project – The Workplan

➢ **How ALEHOOP covers the whole value chain**

The ALEHOOP project involves key actors present during the whole Value Chain

A collaborative supply chain will be built in **ALEHOOP** thanks to a common desire of all the consortium partners to work together, sharing information across the supply chain as a basis to improve quality and value.

31/05/2022

Project Impacts

➢ ***Expected impacts linked to bbi ju kpis***

1. Create at least one new **cross-sector interconnection** in the bio-based economy at local level.
2. Create at least one new **bio-based value chain** involving local stakeholders including farmers, food transformers and SMEs.
3. Demonstrate at least two new **'consumer' products** based on bio-based chemicals, ingredients and materials that meet market requirements.

➢ ***Environmental Impact***

4. Increase the overall **resource efficiency** through the smart use of biomass feedstock.
5. Contribution to **reducing GHG emissions**.

➢ ***Economic Impacts***

6. Reduce import of biomass feedstock, ingredients and additives.
7. Increase income and business opportunities for stakeholders and actors (including primary producers) in the bio-based sectors
8. Improve (regional) competitiveness of stakeholders and actors involved in the new developed bio-based value chains.
9. Less landfill occupation and savings in landfill costs due to waste reduction.

Project Impacts

➢ ***Social Impacts***

10. Contribute to creating high-value regional industries associated with regional biomass production systems.
11. Create new job opportunities in the bio-based sector, particularly the rural, coastal and/or urban areas.
12. Positive nutrition and health issues.
13. Non-GM proteins.

➢ ***Political Impacts***

14. Support to EU policies and global commitments.
15. Standardisation.
16. Social Sciences and Humanities (SSH) and Cross-cutting Key-Enabling Technologies (KETs).
17. Responsible Research and Innovation (RRI).

Project Impacts – Key Value Propositions

KVP of ALEHOOP proteins	KVP of animal feed containing ALEHOOP proteins	KVP of food products containing ALEHOOP proteins
✓ Sustainable production process with lower carbon footprint (-30% vs current conventional protein production process) ✓ Low-price feedstock (-25%) that is available in large quantities: durable protein supply	✓ Better digestibility of selected extracts ✓ Good balance between amino acids and minerals, vitamins, etc. in selected raw materials. ✓ Pairing different materials will help compensate the unbalanced amino acid profile of one type of plant-based protein" ✓ Replacement of part of imported soy ✓ Lower Ex-works price (-5%)	✓ Enhanced nutritional profile ✓ Enhanced techno-funtional properties ✓ Affordable and healthy ✓ Animal-free protein foods suitable for specific population groups

Standardisation in ALEHOOP

➢ **ALEHOOP seeks to meet with the identified TCs to present the project and discuss its potential contribution to the relevant working groups:**

- **CEN/TC 454/WG 3** – Algae processing
- **CEN/TC 454/WG 3** – Product test methods
- **CEN/TC 454/WG 7** – Product test methods - saccharides, proteins, amino-acids
- **CEN/TC 454/WG 4** – Specifications for food/feed sector applications
- **CEN/TC 275/WG 14** – Marine biotoxins
- **CEN/TC 411/WG 4** - Sustainability criteria, life-cycle analysis and related issues
- **CEN/TC 327/WG 2** – Composition
- **CEN/TC 327/WG 4** – Elements and their chemical species

- **ISO/TC 34/SC 4/WG 6** – Pulses
- **ISO/TC 34/SC 20** – Food loss and waste
- **ISO/TC 34/WG 14** – Vitamins, carotenoids and other nutrients
- **ISO/TC 34/WG 21** – Social responsibility/sustainability
- **ISO/TC 34/WG 26** – Plant-based foods
- **ISO/TC 207** – Environmental Management
- **ISO/TC 323** – Circular economy

Standardisation in ALEHOOP

- **ALEHOOP partners seek to participate in ongoing works of the identified TCs and WGs by**
  1. *Contributing to Work Programmes and standards under development*
     - **CEN/TC 275**
       - **prEN 17851** (WI=00275368) Analysis of Foodstuffs - Determination of Ag, As, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Se, Tl, U and Zn in foodstuffs by inductively coupled plasma mass spectrometry (ICP-MS) after pressure digestion
       - **prEN 13806 rev** (WI=00275373) Determination of mercury by atomic fluorescence spectrometry (AFS) - cold vapour technique after pressure digestion
       - **prEN 13806 rev** (WI=00275375) Foodstuffs - Determination of trace elements - Determination of mercury by cold-vapour atomic absorption spectrometry (CVAAS) after pressure digestion
       - **prEN 13806 rev** (WI=00275374) Determination of mercury in food with atomic absorption directly from the foodstuff (elemental mercury analysis)
     - **CEN/TC 327**
       - prEN ISO 30024 rev (WI=00327128) Animal feeding stuffs - Determination of phytase activity

Standardisation in ALEHOOP

- **CEN/TC 411**
  - prEN 16785-1 rev (WI=00411018) Bio-based products - Bio-based content - Part 1: Determination of the bio-based content using the radiocarbon analysis and elemental analysis
- **CEN/TC 454**
  - (WI=00454004) Algae and algae-based products or intermediates – Methods of sampling and analysis - Determination of total lipids using the Ryckebosch-Foubert method
  - FprCEN/TR 17559 (WI=00454011) Algae and algae products - Food and feed applications: General overview of limits, procedures and analytical methods

2. *Contributing feedback or modifications on existing standards being employed by the ALEHOOP partners*
3. *Contribute findings / outcomes to relevant technical committees to contribute new knowledge for the development or modification of new/existing standards*
   - E.g., Methodology to perform the LCA of protein concentrates from bio-mass
   - E.g., Methodology for the extraction / biorefinery of proteins from algae / legumes

Standardisation in ALEHOOP

4. *Identifying gaps in the standardisation landscape, as relevant to ALEHOOP activities, and contributing proposals for the development of new standards relevant to the activities and outcomes of ALEHOOP*
   - Life-cycle assessement with specific regard to the food production sectors
     - Social Life-cycle assessment
     - Life-cycle costing
   - Standard specifications for algae-derived protein ingredients
     - Limits for contaminants
     - Methods of analysis i.e., chemical composition
     - Extraction / production methodology
   - Standard specifications for legume-derived protein ingredients
   - Toxicity analysis with respect to food extracts i.e., mutagenicity, genotoxixty, cytotoxicity

Standardisation in ALEHOOP

Challenges facing standardisation within the ALEHOOP Project:

- Limited technical committees or working groups in the research areas for ALEHOOP
- Partner's lack of knowledge about standards, standardisation activities and the benefits of standardisation, results in poor engagement with the process
- Reluctance of SME's to disseminate findings