

# FUTUREbio

## Project Dissemination and Communication Plan

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## REVISION SHEET

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Version	Date	Author (Partner/Person)	The revision reason
0.1	11.02.2022	Arzum IŞITAN (PAU)	First draft that forms the plan

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## 1. Executive Summary

This Project Dissemination and Communication Plan (PDCP) aims to provide key information and guidelines for the dissemination, internal and external communication, and sustainability of the FutureBio Project. The plan describes the dissemination activities that will be carried out by strategic partnership over the project's lifetime, according to the target group, the objectives of the project and the project proposal. In the preparation of this plan, some parts of the Management and Communication Plan of the DIVA (Boosting innovative Digitech Value chains for Agrofood, forestry and environment) project were utilized<sup>1</sup>

The dissemination plan is based on the following characteristics and principles:

- it will be oriented towards the needs of the users, incorporating the types and levels of information needed into the forms and language preferred by the users, various dissemination methods, including written information, electronic media, and person-to-person contact will be used;
- it will incorporate both proactive and reactive dissemination channels;
- it will include information that target groups have identified as important and also are likely to need;
- it draws upon existing resources, relationships and networks to the maximum extent possible while building new resources as needed by target groups,
- it will include effective quality control mechanisms to assure that information to be included in the system is accurate, relevant, and representative;
- it will include sufficient information so that the target groups can determine the basic principles underlying specific practices and the settings in which these practices may be used most productively;
- it establishes connections to resources that may be needed to implement the information.

The dissemination process is considered as an essential and critical project activity not only for spreading information among target groups but also for motivating external actors to be involved in the different project activities in order to include their contribution within the project outputs and activities. The dissemination actions will:

- Establish or connect with existing networks to promote awareness and engagement;
- Provide information and assistance to local and regional institutions;
- Distribute information to EU-wide networks, stakeholders, influential institutions and opinion-formers relevant to the topic;
- Disseminate new content for academics, university students, industrial workers, institutions, and general public;
- Stimulate dialogue between educational institutions, and public and private institutions related to manufacturing, environment, energy, agriculture sectors.

FutureBio is a two-year KA220-HED-Cooperation Partnerships in Higher Education project supported by Turkish National Agency, on biopolymers between nine partners from Turkey and EU. The FutureBio project which provides information about bioplastics and production methods and will carry out awareness studies with new innovative training materials is the first project in the field. FutureBio has five work packages/phases categorized into four management levels for the purpose of to benefit from

<sup>1</sup> DIVA (Boosting innovative Digitech Value chains for Agrofood, forestry and environment) project <https://www.projectdiva.eu/>

innovative practices among university students, academic staff, industry workers and the society, and to increase the competencies of academics and students with on-site training:

- Management Level- Phase1: Management
- Operation Level- Phase2 and Phase3: Curriculum preparation including needs analysis, company visits and survey applications, report preparation; creation of interactive open-access education modules, lecture guidebook, and VR exercises.
- Dissemination Level- Phase 4: Dissemination and sustainable implementation of the products
- Monitoring and Control Level- Phase5: Quality Control and Monitoring

Contained in this document are

The document encompasses:

- External Communication Plan
  - Communication strategy
  - FutureBio key messages
  - Target groups
  - Dissemination tools and channels
- B. Internal Communication Plan
  - Internal Communication procedures
  - Rules and recommendations for a correct use of external communication tools
  - Working internal templates
- C. Evaluation and monitoring of FutureBio dissemination activities
- D. Obligations and requirements for communication actions

This document is prepared based on information obtained from the following documents:

1. Erasmus+ KA220-HED Project Proposal for “Let's use biodegradable plastic for the future”,
2. Partnership Agreement,
3. Guideline for the Use of the Grant for Grants Awarded in 2021 under Call — EAC/A09/2021.

## 2. Introduction

### 2.1 Purpose of Project Dissemination and Communication Plan

WP4 "Dissemination and sustainable implementation of the products" is the framework of the project where all the materials to be used from project results to dissemination activities will be planned and checked during the entire project. The main purpose of this FutureBio Project Dissemination and Communication Plan (PDCP) is to create a common understanding of introducing, transferring, explaining, and using obtained project results during the project duration. The plan also includes determining how to make internal and external communication and interaction within the project consortium and stakeholders and target groups. The intended audience of this document is all project stakeholders including the project team members, university teachers and students, industrial institutions and their workers, high school students and teachers, public and private institutions, associations, individuals, general society.

FutureBio's dissemination activities aim at communicating the its objectives and results to a wide audience by promoting the adoption of project's results, as well as by facilitating the exchange of information and the interaction with industry, academia, and society as a whole.

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## 2.2 Project Introduction

Modern world has met with plastic/polymeric materials for the first time in the 1400s after Columbus encountered a natural rubber ball in Haiti. Today, polymers have found a wide range of applications thanks to their lightness, easy formability, and find a wide range of uses, from kitchenware to artificial heart valves. Many polymers are used in packaging of food, textile, and machinery, and they are important parts of solid waste disposed of in solid waste landfills.

According to the EU reports, PM packaging parts represent about 8% of the overall refuse in the landfills. Besides all, microplastics which are tiny fragments below 5 mm in size, are a big problem for leakage of rivers, lakes, seas and oceans. They can remain intact for many years. Reuse in manufacturing, incineration for energy generation, biodegradation in compost or in soil can be counted as disposal processes for plastic wastes. To reduce all negativities caused by polymers, "A EU Strategy for Plastics in a Circular Economy" and "Plastic Waste: a EU strategy to protect the planet, defend our citizens and empower our industries" has been developed. In the EU, around 25.8 million tons of plastic waste are produced every year. EU reports also states that only 6% of plastic products are demanded in the EU as recycled plastics. Polymeric waste is frightfully increased with 'single-use' plastics each year. Reusability and nature degradable polymer production are important parts of these strategies. According to the European Green Deal Communication, reducing wastes, compensating carbon footprint emissions, saving resources, and sustainability are key priorities for the EU now and in the future. For a more livable and GREENER world, biopolymers should be developed and used. The FutureBio project was carried out to contribute to these basic priorities. Project aims to make the use of innovative practices among university students, academic staff, industry employees, and the community and to increase the competencies of academics and students with in-place training. This project has been prepared in accordance with the European Union's strategy of developing cooperation, increasing quality and encouraging innovation in the learning activities of individuals and groups in the field of education and training. In the preparation of the project, especially the difficulties and crisis caused by Covid-19, the importance of digital education for digital transformation in accordance with the Digital Education Action Plan was taken into consideration. Considering these issues, it is our priority to develop a high-performance digital technology for university students and industrial workers within the scope of the project. In this way, we aim to develop high quality digital technologies for education of universities and industrial institutions providing information of polymer and biopolymer and their manufacturing technologies all over Europe. We aim to improve capacity and flexibility in education by making digital tools. The project will apply the most innovative training technologies based on E-LEARNING and mobile learning tools with INTERACTIVE VIDEOS and animation applications in game format and VIRTUAL REALITY tools that contribute to improve the trainees' motivation and engagement. The learning material will be structured according to a competency-based learning approach. The use of e-learning and other related technologies in the FutureBio project can provide new opportunities for learners increasing flexibility, motivation and engagement. Students can take control of their own learning and be an active part of the learning process. In addition, mobile learning offers a number of new opportunities for learners and teachers, including the relatively low cost of technologies.

## 2.3 Project Objectives

The target group of the FutureBio project is all project stakeholders including the project team members, university teachers and students, industrial institutions and their workers, high school students and teachers, public and private institutions, associations, individuals, general society. The results of the project are to develop a curriculum, preparation of a guidebook, and to produce education materials with innovative and interactive tools for university students. The project applies the innovative

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technologies based on e-learning, mobile learning, and VR tools with interactive videos and animations in game format. The learning material are structured according to a competency-based learning approach.

FutureBio is aimed to determine the basic knowledge level of target groups on biopolymers by preparing a short survey during the preparation phase of the project.

The objectives of the FutureBio are classified depend on target groups of the project as follows:

#### For ACADEMICIANS and university STUDENTS

- To create an innovative curriculum, open education resources (OERs), virtual reality (VR) tools, laboratory videos, a lecture guidebook,
- To encourage the development of biodegradable polymers (BDPs) and products via courses and outputs
- To guide them to prioritize in their academic career planning
- To increase the scientific competencies with in-place trainings

#### For INDUSTRY

- To create an industrial needs report, a value chain extending from lab to industry, from industry to environment and economy

#### For SOCIETY

- To raise social awareness that plastic pollution is an issue that needs urgent action
- To obtain awareness about BDP products

#### For PROJECT PARTNER

- To increase digital skills
- Developing new projects

### 2.4 Project Focus

With game-based animations, videos, and interactive presentations, distance learning tools are prepared for those who are interested in polymers from all age groups and want to learn about biopolymers. It is expected that the interest in the subject will increase with the online webinars that will be held during the project process. Our project team consists of experts in the fields of polymers and biopolymers, development of training methodology, and innovative education materials. During the project, mutual information transfer, know-how, and brainstorming are carried out, and the partnership will be more efficient. It will develop its scientific knowledge related to the BDP through the training activity (C1) for the project staff. Therefore, we aim for the project partnership to develop itself in innovative education technologies. Thus, the potential of using these technologies in new projects will also be increased. Sustainable environment, green and reduction of harmful waste are among the needs of the EU. For this reason, it is of great importance to raise awareness on BDP among industrial institutions and employees, to research production methods, and to develop university-industry collaborations.

FutureBio will act as a bridge in this regard. The needs of the industry will be investigated in partner countries and a guiding road map will be created. Thus, it is aimed to contribute to the sustainable economy and to be beneficial for the creation of a qualified workforce along with the contribution to the sustainable environment. In the project's detailed awareness/needs analysis and dissemination

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activities (E1-E8), a collaboration with public and private sectors will be done. We plan to spread project results faster by taking the opinions of these institutions. In this way, new projects can be produced.

Dissemination materials, activities, the number of people to reach, and their expected impact will be the following:

- Website will be set up in all partner languages and will be constantly updated.
- 10 webinars will be organized through the project website.
- Establishment of social media platforms will be made by PAU.
- Newsletters will be prepared every six months.
- 7 National Informative Meetings and 1 Workshop (E1-E8) will be organized.
- Announcement of the activities to be performed on local and national platforms. The results of the FutureBio project are expected to be presented in relevant seminars/conferences, and news.
- Some review papers will be published in highly ranked international journals.
- FutureBio consortium has been formed competent institutions in the scientific and technological fields. Dozens of congresses are organized or attended by our partners every year. Within the participation in various conferences, it is planned to distribute approx. 1000 brochures prepared by PAU and all partners, and it is expected to reach 1000 people via website, social media, press/media.
- FutureBio's main target group is university students and academicians. With the dissemination activities, additionally it is expected to reach industry and society using visual and printed materials, website, social media, webinars, and informative meetings.
- At least 285 people are expected to attend national informative meetings. People who work on polymer and its production from the public and private sector, and Municipality will be invited.
- FutureBio has a workshop which will be held by KLU. This event will be organized to present all the outcomes of the project. At least 65 local participants from PAGDER and PAGEV, private sector, and Municipality are expected.
- Within the scope of the project, consortium will carry out various promotional activities in high schools and secondary schools to increase impact: In high schools and secondary schools, activities will be organized such as creating bags yourself by our target group members who are university students. Earth day STEM challenge activities will be organized to reach at least 350 young people with activities at the secondary and high school level, which will be held locally in each country.
- For university students, various activities will be organized: A poster competition will be organized. Social responsibility movements such as collecting plastics etc. will be initiated in the form of a zero-plastic day. Cooperation will be made especially with the student societies.
- It is planned to increase the number of direct people we will reach among university students to 500. Thus, we expect awareness efforts to continue increasingly at the local and across countries.
- We expect to organize at least 3 organizations/activities in each national network. Strong Industry-University cooperation of our partners will help us, especially in terms of local and national impact in terms of employees and companies. For example, PAGDER and PAGEV throughout TR will help us to increase the impact to be created. Thus, we will be able to reach the industrial workers and companies among our target groups very easily and create the effect we want. It is one of the expected effects of the project in combining the information obtained by the universities from the theoretical studies with the industry and preparing an environment for joint studies.

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- Beyond all these, it is expected that the educational materials will be produced using high technology will be met with great interest, especially by the Z generation.
- eTwinning, Erasmus+ Project Results Platform, and EPAL platforms will be used for the dissemination, also.
- Within the dissemination activities for the public, the Layman's Report will provide a general and brief overview of the project and its outcomes, such as the challenges faced by the project, the proposed solutions, the innovative aspects of such solutions, the main achievements and outputs, the main results of the implemented pilots or recommendations for future. The Layman's Report will be the final dissemination activity within the project's duration. The layman's report summarizes the work of a LIFE FutureBio project for a general audience. They are a means of extending the impact of the project beyond the area of implementation.
- Beyond all this, the web platform, which will contain all project outputs, will be kept up to date for at least 7 years by the project team.

All partners have agreed on dissemination and all partners, except the FBK, will hold one informative meeting within the project. They will also work to disseminate project results using their local and national links.

Creation of website and leaflet, and opening of social media accounts (Facebook, Twitter, LinkedIn) will be done by PAU at the beginning of the project. All partners will share project news and announcements on their official website. In addition, since all partner institutions have very strong local press relations, the project activities will be promoted in the local and national press.

For the project logo, PAU, COSVITEC and CTRL will prepare a draft before TPM1 and the project logo will be decided during TPM1. After the logo is decided, a brochure draft that introduces the project will be prepared by PAU and after the approval of the partners, all project partners will be translated into languages and used in all promotion and dissemination activities.

E-Newsletters will be issued to promote the project and its outputs. The newsletters will be disseminated in partners' languages to national training organizations, stakeholders, and media. For this purpose, the partnership will use its National Informal Networks. Newsletters are foreseen, 1 every 6 months of the project. a 2000 newsletter will be sent to stakeholders. Additionally, partners will take advantage of their own networks and of the existing platforms and tools for promotion on European level, to maximize the publicity effect. The dissemination plan at the beginning of the project will be made by all partners to widespread the products and have a vast outreach.

All documented activities will be collected in a final dissemination report which will be made available to the national agency and the public. Arzum Işitan from PAU, Yasemin Öztekin from SU, Evren Çağlarer from KLU, Gratiela Dana Boca from CNU, Massimo Bersani from FBK, Alessandro Pegoretti from UNITN, Aniello Gervasio from COSVITEC, Teijo Lehtonen from CTRL, Caharlotte Thiel from OTHR, and Laura Pasquardini will be responsible dissemination activities as team leaders. COSVITEC will support the dissemination plan and activities due to the solid experience in several former European projects. It has an expert in managing project advertising, plan and advertising campaigns, considering especially dissemination purposes, and structuring main paths for main goals and objectives promotion, involving stakeholders, press, and effectively using 2.0 web tools. It also has an extensive stakeholders' network, that include local, national and International SMEs, Public Entities, NGOs, schools, and Universities, that will benefit from the outputs of FutureBio and help in the dissemination of the project results.

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SU and KLU are in industrial areas so they will also contribute not only web-based dissemination activities but also to provide industrial cooperation to raise awareness.

Before TPM5, PAU will prepare a sustainability plan and share it with all partners. During M5, the plan will be discussed, and its final form will be created, and the activities planned to be attended in the next 3 years and the activities planned to be organized will be discussed.

PRODUCTS will be:

1. Dissemination plan,
2. Sustainability plan
3. Dissemination materials and activities
4. Website and social media platforms
5. Project logo,
6. Newsletters
7. Brochure

QUALITY INDICATORS:

- Number of participants attend seminars/informative meetings/workshop/webinars,
- Number of websites visiting,
- Number of distributed newsletters/brochures,

Number of audience of seminar/congress/webinars

### 3. Dissemination Paths

The dissemination plan includes activities that can be divided into internal and external dissemination according to the target audiences they are addressed to. Both paths reflect the individual interests and strategies of each of the organizations involved but also the needs and visions for the future encouraged through the project results.

The project management team will be responsible for operating the communication plan.

#### 3.1 Internal Communication

The internal communication includes the tools and activities that intend to give awareness of the results to the consortium members and that are not available to the public in general. It refers also to activities aimed to inform members of the partner's organization about the idea underlying biopolymers, concepts applied or developed and the results obtained already. The dissemination activities include the further use of the results within the partner's organization. This kind of communication includes:

- Project meetings and their resulting reports;
- Information exchange through an internal mailing list which addresses and includes all project participants;
- A collaborative workspace document repository;
- Video and phone conferencing;
- Reports, publications, outputs, etc.;
- On-line collaboration;
- Internal meetings

In line with the project objectives, the form, frequency, by whom, purpose, and time of each communication module were determined as can be seen in Table 3.1.

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**Table 3.1 Internal communication tools**

Internal Communication							
Priority Group/Audience	Name	When?	How to communicate?	Communication objectives	Key messages	Responsible	Performance indicators
Project Team	Project team meeting	Weekly	Face-to-face, online platform	Evaluating the progress of the tasks involved in the project	Each project partner institution will hold weekly meetings within itself.	Team leader	The number of participants
Project Team	Project team meeting	Bimonthly	Online platform	Evaluating the progress of the tasks involved in the project	The progress of the project will be observed	PMT	The number of participants
Project consortium	Project meetings	Each 6 months	Face-to-face, online platform (If there are restrictions due to Covid19)	Reviewing and organizing all project activities, checking and quality controlling of milestones	Evaluating the progress of the tasks involved in the project	PMT	The number of participants, number of completed tasks, number of milestones achieved

### 3.2 External dissemination

The external dissemination refers to activities and means that create awareness of the project's partial and overall results and its progress and documentation. The targets of those dissemination activities are specific users and interest groups that were identified above as well as the public in general.

The target group of the FutureBio project is all project stakeholders including the

- Project team members, University teachers, University students (1<sup>st</sup> priority),
- Industrial institutions and their workers (2<sup>nd</sup> priority),
- High school students and teachers, Public and private institutions, Associations (3<sup>rd</sup> priority),
- Individuals, general society (4<sup>th</sup> priority).

The results of the project are to develop a curriculum, preparation of a guidebook, and to produce education materials with innovative and interactive tools for university students. The project applies the innovative technologies based on e-learning, mobile learning, and VR tools with interactive videos and animations in game format. The learning material are structured according to a competency-based learning approach.

The proposed external dissemination activities include the following strategies and tools.

**Table 3.2. External dissemination activities**

External Communication							
Priority Group/Audience	Name	When?	How to communicate?	Communication objectives	Key messages	Responsible	Performance indicators
Stakeholders (1st, 2nd,	Informative meetings	23-24th months	Face-to-face, online platform (If	Sharing project results, evaluating	the project outputs will be shared	PAU SU CNU	The number of participants,

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3rd, and 4th priorities)		of the project	there are restrictions due to covid19)	suggestions from stakeholders and new collaborations	with stakeholders	COSVITEC UNITN CTRL OTHR	Informative meeting reports
Stakeholders (1st, 2nd, 3rd, and 4th priorities)	Workshop	24th month	Face-to-face, online platform (If there are restrictions due to covid19)	Sharing project progress, evaluating suggestions from stakeholders and new collaborations	the project progress will be shared with stakeholders	KLU and PMT	The number of participants, Workshop evaluation report
Stakeholders (1st, 2nd, 3rd, and 4th priorities)	Website	1-24th months	Internet	Sharing project progress, reports and results, sharing basic information related to digitalization of livestock	the project progress, results and basic info will be shared with stakeholders.	PAU and PMT	Number of clicks
Stakeholders (1st, 2nd, 3rd, and 4th priorities)	Project leaflets	6th month	Printed and visual	Sharing of basic information related project	Leaflets will be used all dissemination and information activities	PAU and PMT	Number of leaflets distributed
Stakeholders (1st, 2nd, 3rd, and 4th priorities)	Newsletters	Each 6 months	Online, e-mail	Sharing project progress	the project progress will be shared with stakeholders	PAU and PMT	Number of newsletters sent
Stakeholders (1st priority)	Attendance of congress	12nd-24th months	Face-to-face, online platform (If there are restrictions due to covid19)	Sharing project results	the project progress will be shared in scientific area	PAU and PMT	Number of oral presentation and scientific papers
Stakeholders (2nd priority)	Industry visits	1-24th months	Face-to-face, online platform	Assesment and evaluation, Needs analysis, Sharing project results	Needs analysis will be done with workers	PAU and PMT	Number of visits, number of surveys
Stakeholders (3rd priority)	Promotional activities	1-24th months	Face-to-face, online platform	Different kind of activities in special days	Increasing environmental awareness, water awareness, climate change awareness	PAU and PMT	Number of activities
Stakeholders (1st, 2nd, 3rd, and 4th priorities)	Book	1-24th months	Printed and online platform	Increasing knowledge	Increasing environmental awareness, water awareness, climate change awareness	All partners	Number of download and number of distributed books

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Stakeholders (1st, 2nd, 3rd, and 4th priorities)	Distance education materials and VR tools	4-24th months	Online platform	Increasing knowledge	Increasing environmental awareness, water awareness, climate change awareness	All partners	Number of clicks
Stakeholders (1st, 2nd, 3rd, and 4th priorities)	Webinars	6-24th months	Online platform	Increasing knowledge	Increasing environmental awareness, water awareness, climate change awareness	All partners	Number of clicks

### 3.3 Communication Tools

#### 3.3.1 Project Logo

The project logo, PAU, COSVITEC and CTRL will prepare a draft before TPM1 and the project logo will be decided during TPM1.

#### 3.3.2 Project Leaflet

After the logo is decided, a brochure draft that introduces the project will be prepared by PAU and after the approval of the partners, all project partners will be translated into languages and used in all promotion and dissemination activities.

#### 3.3.3 Lecture Guidebook

University students, academicians, and the industrial firms and employees are FutureBio's target groups, respectively. For a better world, biodegradable polymers should be developed and used. Although research on biodegradable polymers is increasing day by day, their usage is not at the desired level. However, teaching programs including applications can be performed to gain the knowledge and skills about the synthesis, properties, and applications of biopolymers. A common innovative course curriculum will be created (PR1) to develop the knowledge and skills, revealing the gaps in current education. Most of the current English books are focused on medical or food applications of biopolymers. Moreover, there are very few books on biodegradable plastics and their applications.

As the book will fill a gap in the literature, it will be one of the basic works in the related field. On the other hand, there isn't any course book in TURKISH related to biopolymer technology. In this area, a scientific resource that can be taught in Turkish universities will be obtained. Since the book will also be prepared in English, it can be used all over Europe and the world.

The guidebook, which will contain examples from the project partners' works and industry applications, is innovative in this respect. It will be a book that people from different disciplines can use according to their interests. It is planned to open 2 courses on biopolymers in Technology Faculty of Pamukkale University and within the scope of The Graduate School of Natural and Applied Sciences. In accordance with the curriculum, in the second year of the project, educational activities will be carried out in these courses. At least 50 students are expected to take these courses.

Pilot applications will be performed between 17<sup>th</sup> -18<sup>th</sup> months of the Project. Students, who take the courses, will be provided with the interactive learning materials, laboratory videos, and Lecture Guidebook. In addition, all the partners will receive feedback from at least 10 students and 5



academics/scientists regarding the modules and the book. Thus, the opinions of at least 40 professionals in total will be received and used in the revisions of the relevant chapters.

To close an important interdisciplinary course material gap in Turkey and Europe and to contribute to the literature, development of environmental awareness, to encourage biodegradable polymers to be included in the study and research topics of students, academicians, and industrial companies, raising awareness about sustainable environment and decarbonization is among the aims of this work package. This project result will highly impact on all target groups, and it has high potential of dissemination and transferability.

At the 2<sup>nd</sup> TPM2 in Finland on the 6<sup>th</sup> month of the project, the result of PR1 will be discussed. The national reports will be discussed and analyzed, also. The partnership will give the curriculum its final form. These analyses and curriculum will form the basis of PR2 and PR3. Critical thinking related PR3 will be done, and online modules will be shared between all the partners. At the 3<sup>rd</sup> and 4<sup>th</sup> TPMs, the progress of PR3 will be discussed. The partners created a draft content during the project's writing process:

- Basic polymer knowledge, polymer chemistry and polymerization
- Basic biopolymer knowledge
- Chemical and physical properties of a biopolymer, how these are influenced by external factors (pH, I, T).
- Know the structure and properties of important polysaccharides, including the understanding of alginates, zein etc.
- Know the principles behind experimental determination of physical properties (solubility, mechanical properties etc.)
- Use simple methods for polymerization and depolymerization of biodegradable plastics: kinetics and reaction mechanisms
- Preparation biopolymeric materials (alginate film or beads, polymerization of zein, soya etc.) Production of natural aliphatic polyesters as PLA, PHA, bio-polyethylene etc.
- Chemical modifications of biopolymers (chitosan, alginate, PLA, etc.)
- Preparation biopolymeric composites, relation and investigated of bio composite films
- Determine the shape and extension in solution of a biopolymer, based on physical data
- Characterization of biopolymers by FTIR, SEM, X-ray techniques, DLS, chromatography techniques
- Environmental and biomedical applications
- Decarbonization and biopolymers
- Sustainable environment and biopolymers

The partners stated which topics they could contribute to. For example, FBK and UNITN will contribute to the preparation and characterization of Biopolymer, General introduction, State of art on each technique, and Applications parts. PAU will contribute especially to biomedical and industrial applications, and the basis of polymers, also. SU will contribute to chemical and physical properties of polymers, their modifications. KLU will contribute to the book on industrial practices and university-industry collaborations for sustainable impact. CNU will contribute to the book on the use of plastics, their impact on sustainable environmental decarbonization, as well as on the economic aspects and economic sustainability of the issue. OTHR will contribute to the use of plastics as building/construction materials, and reusability. COSVITEC will support SU in the editing and design of the book.

The output's tasks are summarized below:

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- PR3-1: Draft versions in EN (6<sup>th</sup> -16<sup>th</sup> months)
- PR3-2: Pilot testing (17<sup>th</sup> -18<sup>th</sup> months)
- PR3-3: Final version (18<sup>th</sup> -20<sup>th</sup> months)
- PR3-4: Translation in TR (21<sup>st</sup> -23<sup>rd</sup> months)

The products will be Lecture Guidebook in TR and EN. The books will be in pdf formats and will be uploaded to the website. Only a limited number of paper prints will be made. These printing costs were added to exceptional costs.

The quality indicators for this project result will be

- number of students attend the pilot application
- number of academics attend the pilot application
- number of book chapters Providing 90% and above satisfaction from the results of the inter-partnership surveys regarding the quality of the project result (thus determining the problems and collecting the solution suggestions)

### 3.4 Online dissemination tools

#### 3.4.1 Website and social media accounts

In the 1st TPM, after discussing with all partners on the draft design to be prepared by PAU, the website design that will be constantly updated will be decided. Creation of website and leaflet, and opening of social media accounts (Facebook, Twitter, LinkedIn) will be done by PAU at the beginning of the project. All partners will share project news and announcements on their official website. In addition, since all partner institutions have very strong local press relations, the project activities will be promoted in the local and national press.

#### 3.4.2 Newsletters

E-Newsletters will be issued to promote the project and its outputs. The newsletters will be disseminated in partners' languages to national training organizations, stakeholders, and media. For this purpose, the partnership will use its National Informal Networks. Newsletters are foreseen, 1 every 6 months of the project. a 2000 newsletter will be sent to stakeholders. Additionally, partners will take advantage of their own networks and of the existing platforms and tools for promotion on European level, to maximize the publicity effect. The dissemination plan at the beginning of the project will be made by all partners to widespread the products and have a vast outreach.

#### 3.4.3 Interactive open access education modules

Since the main target group for this result is students, it is planned to open 2 courses on biopolymers in Technology Faculty of PAU and within the scope of The Graduate School of Natural and Applied Science In accordance with the prepared curriculum (PR1), in the 2nd year of the project, educational activities will be carried out in these courses. Students who will take these courses will attend an awareness survey before the course and the level of awareness will be controlled by repeating the same survey at the end of the semester. At least 50 students are expected to take these courses.

Pilot applications between 17-18th months of the Project will be performed by at least 50 students and 40 academics in total. Students, who take the courses, will have an opportunity to utilize interactive learning materials, laboratory videos, and Lecture Guidebook. The feedback will be requested and thus, necessary revisions will be applied to the modules.

In addition, all the partners will receive feedback from at least 5 academics/scientists regarding the modules. Thus, the opinions of at least 40 professionals in total will be received and used in the revisions of the relevant tools/chapters.

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The studies of BPs are interdisciplinary research including different kinds of experts from material science, biotechnology, physics, chemistry, and engineering from environment to manufacturing and medical technologies. The required competencies for these areas can be put together along the concept of biopolymer engineering providing novel concepts, materials, enzyme technology, experimental protocols, reference substances, as well as inventions. There are no online modules prepared on experiments for the LABORATORY APPLICATIONS at university level. However, laboratory works are especially helpful to gain the knowledge and skills to make scientific evaluations about the synthesis, properties, and applications of biodegradable polymers. Production from different materials and characterization of biopolymers will be the main video topics.

Within this result, it is aimed to create innovative technologies based on E-LEARNING and mobile learning tools with interactive videos and animations in-game format. The materials will be structured according to a competency-based learning approach (PR1). The use of e-learning technologies in the FutureBio project can provide new opportunities for learners increasing flexibility, motivation, and engagement. Students can take control of their own learning and become an active part of the learning process.

All the students, academicians, scientists, and sector workers need new teaching methods and tools to match modern implementation. Mobile learning offers new opportunities for learners and teachers, including the relatively low cost of technologies, also. With game-based animations, videos, and interactive presentations, distance learning tools will be prepared for those who are interested in PMs from all age groups and want to learn about BDPs. Increasing digital competencies, enhancing the quality of education and making it interesting, development of environmental awareness, to encourage biodegradable polymers to be included in the study and research topics of students, academicians and industrial companies, raising awareness about sustainable environment and decarbonization is among the aims of this result. With the creation of the laboratory videos to be prepared and the interactive platform targeting game-based learning, this project result will highly impact on all target groups, and it has high potential of dissemination and transferability.

**METHODOLOGY:** At the 2nd TPM in Finland on the 6th month of the project, the result of PR1 will be discussed. The national reports and international report will be discussed and analyzed, also. The partnership will give the curriculum's final form and create a competence map. These analyses, curriculum, and competence map will be used to form the basis of PR2 and PR3. Critical thinking related with PR2 will be done and online modules will be shared between all partners. Providing preliminary information to the Project staff about the creation and use of online materials and videos will be done by PAU. SUPSI will support PAU and all partners in this task. At the 3rd and 4th transnational meeting (TPM3 and TPM4), the progress of PR2 will be discussed. First, an online course platform using free material creation tools (like h5p) will be created on the website. The primary role of the platform will be enabling the student to learn on their own and encouraging them to evaluate themselves. Content preparation of tools and videos will be done through PR1. During TPM2, they will be negotiated and the sections and topics will be shared by all partners. Until the 14th month, the draft EN versions will be done. At the TPM3, the progress of this result will be evaluated. Encountered problems and suggestions with the project partners will be discussed and the modules prepared in EN will be reviewed. After the month of 14th, project partners will translate those materials into their own languages. Pilot applications between 17-18th months of the Project will be performed by at least 50 students and 40 academics in total. After testing the materials and interactive videos, with an evaluation questionnaire, it will be determined by their missing parts or need. Please describe the division of work, the tasks leading to the production of the result and the applied methodology to be developed. After

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completion of all pilot implementations, the results will be compared and evaluated between partners during TPM4. After the necessary parts are corrected, the materials and the platform will be finalized.

The tasks are summarized below:

- Content preparation (PR2-1<sup>st</sup> /6<sup>th</sup> months),
- Laboratory videos preparation (PR2-2/6<sup>th</sup> -14<sup>th</sup> months), Interactive modules preparation in EN (PR2-3/6<sup>th</sup>-14<sup>th</sup> months) and in TR (PR2-4/15<sup>th</sup> -16<sup>th</sup> months),
- Pilot testing (PR2-5/17<sup>th</sup> -18<sup>th</sup> months),
- Revision and finalization (PR2-6/18<sup>th</sup> -23<sup>rd</sup> months).

The products will be in EN, FI, GE, TR, RO, and IT:

1. Online platform
2. Laboratory videos
3. Online OERs

The quality indicators for this project result will be:

- Number of students attend the pilot application
- Number of academics attend the pilot application
- Number of online tools
- Number of created videos
- Number of tools to be changed Providing 90% and above satisfaction from the results of the inter-partnership surveys regarding the quality of the project result (thus determining the problems and collecting the solution suggestions)

#### 3.4.4 VR tools

The VR training solutions complement the innovative curriculum, guidebook, and online material. There are no VR tools prepared on manufacturing and using of BDPs. Production from different materials and characterization of BDP will be the main video topics.

VR as a technology has the power to take the user into another place. This will be utilized in making more immersive, interactive, and illustrative training materials which complement the more traditional books and online materials. Furthermore, virtual reality solution makes the training more motivating for all the target groups. The created VR application will consist of a set of 360-degree images and videos with added informative (such as text, photos, audio, video) and gamified content (such as quiz, finding hidden information). The best user experience will be gained by using mobile VR glasses (such as Oculus Go / Quest / Quest 2) where the user gets a stereo view to the training content. The universities and companies often already have these devices, and they are available for a reasonable price. VR glasses will be used when presenting the material in the events of the project. The VR content will also be provided through a web browser which makes it available also to those users, not in possession of compatible VR glasses.

The content of the VR application is targeted to three use cases (with some proposed content ideas):

1. For the university teachers: An immersive view to a lab exercise for setting up a similar exercise. The purpose is to ease the starting of necessary exercises by having an immersive view to a model exercise.
2. For the university students:
  - a) An immersive view to a lab demonstration which is not possible to be implemented due to safety or equipment/cost reasons.



b) A tour to a chemistry plant for viewing in industry scale the process done in the exercise as a lab size.

3. For the public: For viewing the impact of unprocessed plastic waste to the environment and the choices one can make in everyday life (e.g. what kind of plastic bags to select at a grocery store, etc.).

**METHODOLOGY:** During TPM2, basic training will be provided to the project team on the use of VR equipment. After the basic information, each institution that will carry out the pilot applications will receive one VR glasses from the project management budget that can be used alone without the need for a computer. During TPM2, the content of scenarios will be decided, and a division of labor will be made for the preparation of the scenarios. The scenarios to be prepared in English will be shared with CTRL. For the VR tools to be prepared, the scenarios containing basic information will be prepared by universities with application laboratories, FBK, and INDEVINERE.

VR tools developed in accordance with the scenarios will be reviewed at every TPMs. With the feedback received after the pilots, the parts that need to be developed in the tools will be advanced. The tools prepared in EN will then be translated into all partner country languages and new, modern, and interesting training modules that can be used all over EU will be prepared. Increasing digital competencies (students, academics, and project staff), enhancing the quality of distance education, and making it interesting, development of environmental awareness, to encourage BDP to be included in the study and research topics of students, academicians, and industrial companies, raising awareness about sustainable environment and decarbonization is among the aims of this project result.

With the creation of the laboratory videos to be prepared and the interactive platform targeting game-based learning, this project result will highly impact on all target groups, and it has high potential of dissemination and transferability.

The virtual reality content will also be provided through a web browser which makes it available also to those users, not in possession of compatible VR glasses.

The PR4's tasks are summarized below:

1. PR4-1: Study of existing VR applications (4<sup>th</sup> -5<sup>th</sup> months)
2. PR4-2: Determining content for VR exercises (6<sup>th</sup> -8<sup>th</sup> months)
3. PR4-3: Implementation of the first versions of the VR exercises in English (9<sup>th</sup> -16<sup>th</sup> months)
4. PR4-4: Testing and gathering feedback on the VR exercises (17<sup>th</sup> -18<sup>th</sup> months)
5. PR4-5: Final version of the VR exercises in all partner languages (18<sup>th</sup> -20<sup>th</sup> months)
6. PR4-6: Preparing the transferability guide (21<sup>st</sup> -22<sup>nd</sup> months)
7. PR4-7: Evaluation (23<sup>rd</sup> months)

Its products will be the VR tools in all partner languages and Transferability guide.

The quality indicators for this project result will be

- Number of students attend the pilot application
- Number of academics attend the pilot application

### 3.5 Internal rules and procedures for a proper use of communication tools

#### 3.5.1 Website

FutureBio website is the main channel to communicate with our audiences and disseminate news. Every partner of the project will have the ownership of one or two website's users (depending on their needs). Every user may create and upload content on the website. However, an approval from PAU, who will

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act as website administrator will be needed who will have to priorities, make sure the content is aligned with the general rules and approve it (before it goes public).

### 3.5.2 Publications, Press Releases, Interviews, and Webinars

The content of each publication will be agreed by all members of the PMT. Every partner will oversee the translation of the content and lead the dissemination at National level.

### 3.5.3 Newsletters

It will be prepared in English by the host institution and shared with the partners within two weeks after each transnational project meeting. After the approval of all partners, it will be translated into the language of each partner country and uploaded to the website.

### 3.5.4 Social media accounts

All project activities will be shared by PAU as TR and EN on social media accounts.

## 4. Evaluation and Monitoring of Dissemination Activities

### 4.1 Indicators

FutureBio has “Quality assurance of the products” phase which includes:

- Quality plan
- Quality report
- Meeting evaluations
- Interim Evaluation
- Testing evaluation
- Final evaluation

A Quality Plan will be prepared and shared before starting the project by the coordinator. At the first Transnational Meeting (M1), it will be discussed and necessary corrections will be made. Quality Plan will include detailing procedures, criteria and resources will be agreed by all partners. The Partners will use indicators to measure on a regular basis the rate of success of foreseen results using quality plan: to ensure that the project outputs follow the specified standards to enrich all training and testing activities with quality standards to provide a final project validation report qualitative and quantitative indicators will be used in overall project management:

- Quality of Project management arrangements – no more than 20% rate of delays in delivering results throughout the Project,
- Effectiveness of coordination by the project coordinator – no more than 20% rate of issues and problems detected in coordination,
- Effectiveness of the monitoring and evaluation processes – 100% of partners and coordinator compliance with quality monitoring process tasks,
- Effectiveness of quality arrangements – 100% rate of compliance with recommendations and amendment according to the problems detected.

A set of indicators has been specifically defined to monitor successful distribution in terms of efficiency and effectiveness of dissemination activities. These indicators include:

**Table 4.1** Set of indicators for Dissemination activities

Outputs / Deliverables/ Project Results	Measurement Unit	Target Value
Project Logo	--	1
Animated logo for Website	--	1
Project brochure (in English and local editions in national languages)	Nr of project brochure produced	1000
Project poster (in English)	Nr of project posters produced	10
Project Roll-ups (in English)	Nr of project rollups produced	3
International FutureBio e-newsletter	Nr of newsletter produced	5
Movie-documentary about FutureBio results, main outcomes and events	---	1
Number of regional local events organized for external audiences	Nr of events organized	7
Number of European events organized for external audiences (including a final event)	Nr of events organized	1
Number of events attended representing the project	Nr of events attended	7
Presence at tradeshows and business event	Nr of events attended	3
Communication with SMEs for	Nr of events	24
Scientific publications in peer-review journals, international conferences and workshops participation in events or calls	Nr of publications	10
General press articles published	Nr of publications	8
Activity and dissemination in FutureBio website	Nr of entries or publications	50
External audience of FutureBio website	Nr of unique visitors (based on Google Analytics)	1000
Activity and dissemination in social media	Nr of posts	150
Social Media followers	Nr of followers	1000
Multimedia material downloads (website)	Nr of downloads	1000
Animations	Nr of clicks	500
VR Tools	Nr of clicks	500
Book downloading	Nr of download	500
Informative meetings	Nr of attendance	380
Visiting high schools	Nr of events	20
Other environmental activities	Nr of events	10

## 4.2 Dissemination log

The Dissemination Log is a specific tool for monitoring partners dissemination activity during the whole project. The log is designed in an excel sheet and shared with all partners in a separate Google Drive folder.

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When a FutureBio partner release or carry out and specific dissemination action (for example, organization of an event, publication on their website, attendance to a third-party workshop to promote FutureBio, etc.) a new entry on this excel log must be added including some basic information about the action made.

Every three months, the dissemination coordinator will check the log and refresh the progress of the specific indicators in order to make a close monitoring on dissemination efforts. Specific email reminders will be sent to all partners to remind them to complete the log before each three-month period.

**Table 4.2 FutureBio Dissemination Log**

Date	Partner	Place of dissemination	Dissemination activity type:	Means (email, social media, distribution of leaflets, online article, scientific paper, press release etc...)	Brief description of the activity	Number of participants	Target group	Link to the folder with pictures

In each activity, the signature and information form seen in Table 4.3 will be completed by the participants and a scanned copy will be shared with the coordinator after the activity.



Event name:

Name of organization performing the event:

Date of Venue:

Place of Venue:

**Table 4.3 Attendance list**

	Name and Surname	National ID	Institution	Sign
1				
2				

## 5. Obligations and Requirements for Communication Actions

### 5.1 Information on EU funding — Obligation and right to use the logos

This project is financed by the European Commission through the Turkish National Agency. For this reason, within the framework of the contract signed with the Turkish National Agency, it is obligatory to use the

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Co-funded by the European Union

following logos in the Erasmus+ and European Solidarity Program (ESC) project outputs. The 3 obligatory logos are the Presidency for the EU logo, the Turkish National Agency logo, and the EU logo:



Co-funded by the European Union

For communication activities:

“This project has received funding from the Turkish National Agency and European Commission Erasmus+ program under grant agreement No 2021-1-TR01-KA220-HED-000032160”.

### 5.2 Disclaimer excluding Agency and Commission responsibility

Any communication activity related to the action must indicate that it reflects only the author's view and that the Agency and the Commission are not responsible for any use that may be made of the information it contains:

“Funded by the Erasmus+ Programme of the European Union. However, European Commission and Turkish National Agency cannot be held responsible for any use which may be made of the information contained therein”