FUTUREbio

Project Management Plan

Project Acronym:	FutureBio
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REVISION SHEET

Version	Date	Author (Partner/Person)	The revision reason
0.1	19.01.2022	Arzum IŞITAN (PAU)	First draft that forms the plan

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1. Executive Summary

This Project Management Plan (PMP) aims to provide key information and guidelines for the implementation of the FutureBio Project so that all stakeholders have a common understanding on what must be achieved, what must be delivered, who will involve, when to deliver during the Project term. In the preparation of this plan, some parts of the Management and Communication Plan of the MSIE 4.0 project were utilized[1].

FutureBio is a two-year KA220-HED-Cooperation Partnerships in Higher Education project supported by Turkish National Agency, on biopolymers between eleven 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 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

- FutureBio Consortium covering list of partners, organization structure, and roles and responsibilities,
- Project Operations Management outlining tasks, deliverables, resource allocations, work plans and operations procedure,
- Project Financial Management providing general provision, financial reporting, eligible costs, procedures and supporting documentation for reimbursement and budget transfer,
- Project Risk Management highlighting risk management procedure and risk assessment form.

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.

[1] Curriculum Development of Master’s Degree Program in Industrial Engineering for Thailand Sustainable Smart Industry, Project Management and Communication Plan. https://msie4.ait.ac.th/

2. Introduction

2.1 Purpose of Project Management Plan

"Project Management and Implementation" is the framework of the project where all the activities, correct timing, project quality, functioning, all 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 Management Plan (PMP) is to create a common understanding of what must be achieved, what must be delivered, who will involve, and when to deliver during the project duration. 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.

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 theirs 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 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 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.

3. FutureBio Consortium

3.1 Consortium Members

The FutureBio Consortium consists of 10 partners and 1 associated partner of whom 3 are from Turkey and 8 are from EU partner universities, institutions, and SMEs. The 11 partners, in the same order as in the project proposal are as follows:

1. Pamukkale University - PAU - TR (Coordinator)
2. Kırklareli University - KLU - TR (Partner)
3. Selçuk University - SU - TR (Partner)
4. Fondazione Bruno Kessler - FBK - IT - (Partner)
5. Cosvitec Societa Consortile Arl - COSV - IT - (Partner)
6. Universita Degli Studi Di Trento - UNITN - IT - (Partner)
7. Universitatea Technica Cluj-Napoca - CNU - RO - (Partner)
8. CTRL Reality Oy - CTRL - FI - (Partner)
9. Indivenire srl - IND - IT - (Partner)
10. Ostbayerische Technische Hochschule Regensburg - OTHR - DE - (Partner)
11. University of Applied Sciences of Southern Switzerland - SUPSI - CH - (Associated Partner)

Besides, there are also associated partners from various sectors including government agency, non-profit organization, private companies, associations, and foundation. The prominent institutions among these are PAGDER and PAGEV, and they will be involved in the creation, promotion, and dissemination of the results of the project.

3.2 Organization Structure

The consortium is structured as illustrated in Figure 1. It composes of a project management team (PMT) including project quality board (QB), project coordinator (PC), work package leaders (WPLs), project result leaders (PRLs), and members.

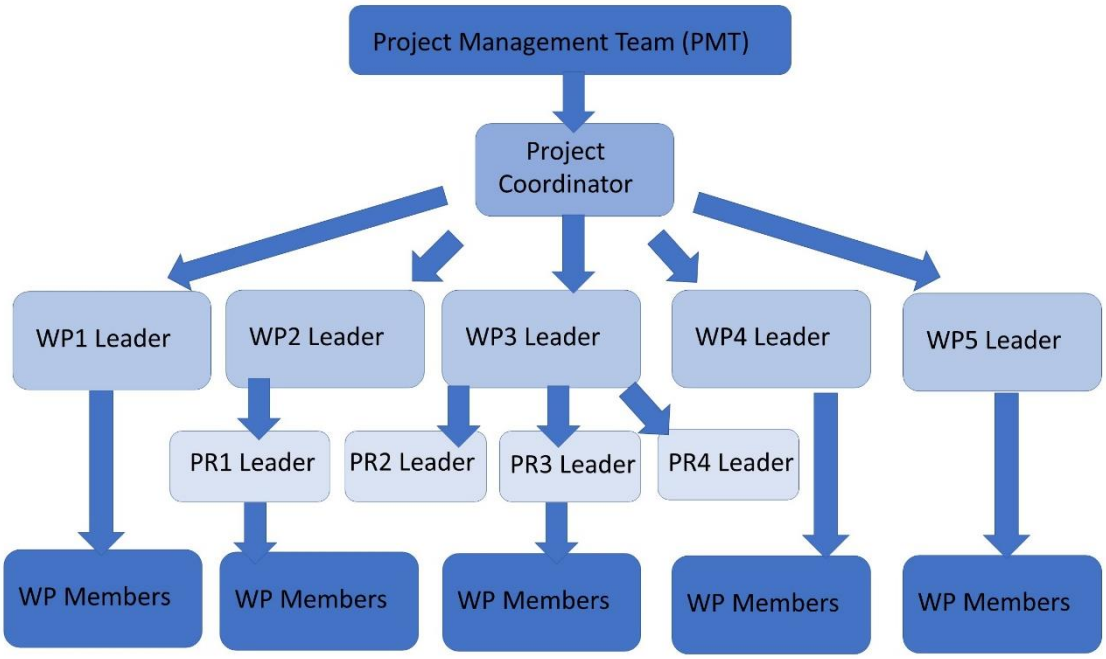


Figure 1. FutureBio management model

The relationship between work packages and project results is shown in Figure 2.

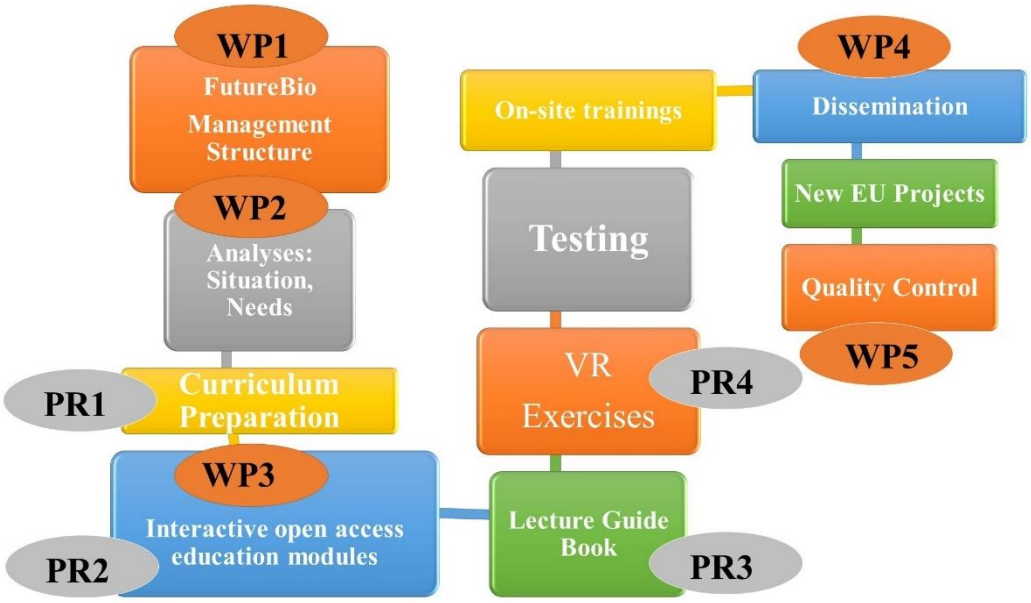


Figure 2. FutureBio work packages and project results relationship

3.3 Roles and Responsibilities

3.3.1 Project Management Team (PMT)

A management team is formed by choosing one person from each of the project partners: Arzum Işıtan from PAU, Evren Çağlarer from KLU, Yasemin Öztekin from SU, Gratiela Boca Dana from CNU, Massimo Bersani from FBK, Aniello Gervasio from COSVITEC, Alessandro Pegoretti from UNITN, Teijo Lehtonen from CTRL, Laura Pasquardini from INDIVENIRE, Charlotte Thiel from OTHR, and Nadia Catenazzi from SUPSI. PMT is responsible for management, implementation, monitoring, and quality on behalf of their organization. This team is also responsible for the communication and decision-making points between

their institutions and the consortium. All project results and activities of the project (including surveys, pilots, dissemination, impact, and sustainability) were determined by the PMT during the preparation phase for a proper and fair budget sharing. In addition, all risks that may arise in the realization of these activities, especially COVID19, have been taken into consideration. The PMT will oversee fulfilling the following duties:

- Establishing Quality Control Board (QB);
- Analyzing reports, communication issues, and dissemination of the project results among the partners and external project partners;
- Resolving problems and taking corrective actions;
- Resolving conflicts that may arise among the consortium members;
- Deciding on withdrawal of partnership.

The QB checks that the project results and activities are produced and performed in accordance with the indicators specified in the project quality plan (QP). It is formed by PMT at the Kick-off meeting, by determining a responsible person from each partner. In each TPM, the QB reports to the project consortium to ensure quality assurance.

3.3.2 Project Coordinator (PC)

The project coordinator is responsible for coordination of activities in compliance with the contract with the Turkish National Agency (TNA) and third parties in relation to the project.

The PC has total responsibility for the overall project activities and results, and their successful completion. To succeed in this responsibility, the PC must work closely with TNA and its assigned project expert to ensure that adequate resources are applied. The PC also has responsibility for planning, ensuring, and realizing that the project is successfully completed on time, within the project budget, and at a high level of quality.

The PC will oversee fulfilling the following duties:

- Contacting between the Project consortium and the Turkish National Agency;
- Formalizing Partnership Agreements, legal activities, tasks, and networking among the project partners;
- Establishing Project Management Team (PMT);
- Creating a consortium communication structure;
- Monitoring the compliance of the Grant Agreement, assessment, evaluation, and control of any deviation in the progress of the project;
- Monitoring the executions of the project plans;
- Coordinating of project activities;
- Resolving conflicts of interest and putting in place corrective actions whenever required;
- Managing risks by identifying and classifying them and by putting them in contingency plans, establishing, and assessing success criteria;
- Planning transnational and online project meetings;
- Preparing and submitting mid-term and final project reports;
- Implementing project policies and procedures;
- Archiving all project data;
- Managing the project team.

3.3.3 Work Package Leaders (WPLs), Co-Work Package Leaders (Co-WPLs), Project Result Leaders (PRLs) and Co-Project Result Leaders (Co-PRLs)

FutureBio has 5 WPs and 4 Project Results (PRs). PAU is the leader of all WPs:

- In WP1 and WP4 supporting with all partners;
- In WP2 with Co-WPLs (CNU and COSVITEC) and all partners;
- In WP3 with Co-WPLs (SU, FBK, and CTRL) and all partners;
- In WP5 with Co-WPL (CNU).

Work package leaders and co- work package leaders are responsible for the proper execution of WP activities and of the delivery of the WP outputs as promised in the awarded proposal on time. WPLs and Co-WPLs will work closely with the PMT and QB.

In WP2 and WP3, FutureBio has 4 PRs, 7 Informative Meetings (IMs), 1 International Workshop, and 2 training activities:

- CNU with COSVITEC are PRL and co-PRL of PR1. All partners have tasks.
- PAU is PRL of PR2. All partners have tasks.
- SU is PRL of PR3. All partners have tasks.
- CTRL is PRL of PR4. All partners have tasks.
- FBK is responsible for organizing the C1 and C2 training activities with UNITN and IND.
- PAU, CNU, CTRL, COSVITEC, SU, UNITN, and OTHR are responsible for IMs (E1-E7).
- KLU is responsible International Workshop (E8) which will be organized with final TPM.

3.3.4 Project Members

All members of the project partners specified in the project proposal are project members. During the project, new members can be added by the partners as needed. Project members have responsibility for conducting project activities. The members assist the PC, WPLs, and PRLs in planning the development effort and help construct commitments to complete the project within established schedule and budget constraints.

3.3.5 Project Administrative Team

The technical and administrative activities of the project will be assured by the PC with the help of the administrative team from PAU. The duties are as follows:

- Daily administrative/financial management of the project, reporting, financial accounting/cost claiming and budgeting;
- Establishment of a budget and schedule-controlling system;
- Collection and storage of data for monitoring;
- Control of the use of resources and budgetary execution.

3.4 Lists of PMT and Administrative Team Members

Table 1: Project Management Team

Partner	Role	Name	Email
PAU	Chair	Arzum Işıtan	aisitan@pau.edu.tr
KLU	Member	Evren Çağlarer	ecaglarer@gmail.com
SU	Member	Yasemin Öztekin	yoztekin@gmail.com
CNU	Member	Gratiela Boca Dana	bocagratiela@yahoo.com
FBK	Member	Massimo Bersani	bersani@fbk.eu
COSVITEC	Member	Aniello Gervasio	nellogervasio@cosvitec.eu
UNITN	Member	Alessandro Pegoretti	alessandro.pegoretti@unitn.it
CTRL	Member	Teijo Lehtonen	teijo@ctrlreality.fi
IND	Member	Laura Pasquardini	l.pasquardini@gmail.com
OTHR	Member	Charlotte Thiel	charlotte.thiel@oth-regensburg.de
SUPSI	Member	Nadia Catenazzi	nadia.catenazzi@gmail.com

Table 2. Administrative Members

WP	Partner	Role	Name	Email
1	PAU	PC	Arzum Işıtan	aisitan@pau.edu.tr
2	PAU	WPL-2	Cem Gök	cemgok@pau.edu.tr
	CNU	PRL-1	Gratiela Boca Dana	bocagratiela@yahoo.com
	COS	Co-PRL-1	Aniello Gervasio	nellogervasio@cosvitec.eu
	PAU	Co-PRL-1	Fatma Susar	fatmas_30@yahoo.com
3	PAU	WPL-3	Mine Sulak	msulak@pau.edu.tr
	PAU	PRL-2	Ramazan Çağrı Kutlubay	rckutlubay@pau.edu.tr
	SUPSI	Co-PRL-2	Lorenzo Sommaruga	lorenzosommarug@gmail.com
	SU	PRL-3	Yasemin Öztekin	yoztekin@gmail.com
	CTRL	PRL-4	Teijo Lehtonen	teijo@ctrlreality.fi
	FBK	C1, C2	Massimo Bersani	bersani@fbk.eu
	UNITN	Co- C1, C2	Alessandro Pegoretti	alessandro.pegoretti@unitn.it
	IND	Co- C1, C2	Laura Pasquardini	l.pasquardini@gmail.com
4	PAU	WPL-4	Volkan Onar	vonar@pau.edu.tr
	KLU	Co- WPL-4	Evren Çağlarer	ecaglarer@gmail.com
	SU	Co- WPL-4	Ülkü Sayın	ulkusayin@gmail.com
	OTHR	Co- WPL-4	Charlotte Thiel	charlotte.thiel@oth-regensburg.de
	UNITN	Co- WPL-4	Alessandro Pegoretti	alessandro.pegoretti@unitn.it
	CTRL	Co- WPL-4	Teijo Lehtonen	teijo@ctrlreality.fi
	COS	Co- WPL-4	Aniello Gervasio	nellogervasio@cosvitec.eu
	CNU	Co- WPL-4	Gratiela Boca Dana	bocagratiela@yahoo.com
5	PAU	WPL-5	Fatma Susar	fatmas_30@yahoo.com
	CNU	Co- WPL-5	Gratiela Boca Dana	bocagratiela@yahoo.com

3.5 Decision Making

All main project decisions will be made in TPMs by PMT. PMT decisions will be consensual, but if it is necessary, a voting procedure can be applied. All PMT members will have one vote. However, there

may be urgent cases that need immediate decisions to move the project forward. In such the cases, PC will communicate with all PMT members via email and/or WhatsApp application to reach the decisions. Country level decisions, when applicable, will be made by the partners with informing the PC, when necessary. All decisions will be documented and saved in a project archive.

4 Project Management Stages

4.1 Project Activities and Deliverables

FutureBio has 5 WPs, 4 Project Results (PRs), 7 Informative Meetings (IMs), 1 International Workshop, and 2 training activities.

The FutureBio project implementation is set up as to be 5 work packages/phases.

- WP1/P1: Project management (1-24th m)
- WP2/P2: Curriculum Preparation (1st-6th m) (PR1)
- WP3/P3: Preparation of Interactive open access education modules (6th-23rd m, PR2), Lecture Guidebook (6th-23rd m, PR3), and VR Exercises (4th-23rd m, PR4)
- WP4/P4: Dissemination and sustainable implementation of the products (1st-24th m)
- WP5/P5: Quality assurance of the products (1st-24th m)

Each phase is characterized by tasks, milestones, and products foreseen as shown below:

4.1.1 WP1 Management

Project Management and Implementation is the framework of the project where all the activities, correct timing, project quality, functioning, all materials to be used from project results to dissemination activities will be planned and checked during the entire project. It will be done by the WP1 leader - PC, PMT, and the other members of the consortium.

Activities to be carried out within the scope of WP1 and foreseen time periods:

- Set up management and communication platforms (1st m),
- Preparation of project's contracts (1-3rd m),
- Establishment of the project management team and quality board (1st m),
- Preparation of Management Plan, Dissemination and Communication Plan, and Quality Plan as draft (1st m),
- Finalization of Management Plan, Dissemination and Communication Plan, and Quality Plan (3rd m),
- Assuring of project coordination and organization of activities by Transnational Project Meetings (TPMs) (1st -24th m)
- Ensuring the provision of project documents (1st -24th m)
- Organizing technical trips to local plastic companies (1st -24th m)
- Evaluation of the satisfaction of the project partners and the progress of the project in each 6-month period of the project

The activities planned to be carried out with the "Project Management and Implementation" budget are as follows:

- Preparing and printing all promotional materials for the project (banner, brochure, etc)
- Getting the website and host services of the project
- Obtaining translation services for project results
- Preparing videos for OERs
- Congress participation fees

- Open access fee for scientific publications
- Local company visits by the project team
- Webinars organizing

WP1's products are

- Management plan and platform,
- Interim report,
- Final report,
- Minutes of Meetings.

The quality indicators to be used in this work package are as follows:

- Partnership evaluation surveys,
- Meeting evaluation surveys,
- Number of activities,
- Number of activities attended by project partners.

4.1.2 WP2 Curriculum Preparation

Research conducted during the preparation phase of the project has shown that although plastics and biodegradable polymers (BDPs) are very important for the future of the world, it was determined that training and educational materials are not enough at the undergraduate and graduate levels. This point is the main idea of FutureBio. For this reason, an innovative curriculum (PR1) will be created to develop the knowledge and skills and to gain the ability of undergraduate and associate degrees within the scope of BDP applications. While creating this curriculum, the situation and needs analysis for companies in the sector, employees working in these companies, university students and academicians close to this field will be made.

This WP includes the creation of the first project result (PR1). CNU will be the PRL with COSVITEC's co-leadership. All partners will contribute to this output creation. PR1 will be prepared for university students. But in detail, the awareness work carried out during the project preparation period will be detailed and the awareness and training needs of students, academicians, industry employees, and companies on the subject will be determined. For this reason, academics, companies, and employees are also the target groups of this project result. This result will guide and influence the content and quality of PR2 and PR3, which will be prepared for all target groups. Because of the determined lack of training and educational materials based on biopolymers at the undergraduate and graduate levels, an innovative curriculum (PR1) will be created to develop the knowledge and skills and to gain the ability of undergraduate and associate degrees.

The PR1's tasks are summarized below:

- Detailed needs analysis for academics and students (PR1-1/1-2nd month);
- Determination of firms and institutions (PR1-2/2nd month); Company visits and survey applications (PR1-3/3rdm); National reports (PR1-4/4th month);
- International reports (PR1-5/5th month);
- Final curricula (PR1-6/6th month).

While creating this curriculum, the detailed situation and needs analysis of companies producing in the sector, employees working in these companies, university level students and academicians close to the field will be made. Project team prepares national and international reports which will include situation and needs analysis for academics, students, and companies. At the same time, these

analyses will reveal awareness situations for individuals and institutions. For this purpose, each university will apply the survey studies to be prepared at the beginning of the project to its academicians and graduate and undergraduate students. Each university will apply these surveys to at least 5 academicians and 10 students. Since the consortium has 6 universities, it is aimed to apply these surveys to 30 academicians and 60 students in total. Each university will make the choice of people to be surveyed.

Each project partner will search companies which produce plastics/bioplastics and their products locally and nationally and create a portfolio. The managers and employees of these companies will be asked to fill out the survey prepared at the beginning of the project, in line with the opportunities, by contacting and visiting the company. By contacting at least 3 companies for each partner, they are expected to complete these needs analysis surveys. In this way, it is expected to be in contact with at least 24 companies.

All national reports will be made into a single international report. The draft curriculum prepared by PAU, will be compared with the needs emerging as a result of the surveys and field studies to be conducted. After the survey results are made into an international report, the necessary updates will be made with the participation and approval of all partners during TPM2. The draft curriculum will be compared with the needs emerging as a result of the surveys and field studies to be conducted. After the survey results are made into an international report, the necessary updates will be made with the participation and approval of all partners during TPM2.and a curriculum that can be used as educational material across Europe will be prepared.

After the survey results are made into an international report, the necessary updates will be made with the participation and approval of all partners during M2. The draft curriculum study is given below:

1. Basic polymer knowledge- polymer chemistry and polymerization
2. Basic biopolymer knowledge -Chemical structure, understanding and prediction of certain physical properties of a BDP, and how these are influenced by external factors (pH, I, T)
3. Know the structure and properties of important polysaccharides, including the understanding of alginates, zein etc.
4. Know the principles behind experimental determination of physical properties (solubility, mechanical properties etc.)
5. Use simple methods for polymerization and depolymerization of biodegradable plastics: kinetics and reaction mechanisms
6. Preparation biopolymeric materials (alginate film or beads, polymerization of zein, soya etc.)
7. Production of natural aliphatic polyesters as PLA, PHA, bio-polyethylene etc. Chemical modifications of biopolymers (chitosan, alginate, PLA) aimed at enhancing the biological properties of the polymer and increase of water solubility
8. Preparation biopolymeric composites, reaction and investigated of bio composite films
9. Determine the shape and extension in solution of a biopolymer, based on physical data
10. Characterization of biopolymers by FTIR, SEM, X-ray techniques, DLS, etc.
11. Environmental and biomedical applications (adsorption of toxic materials, controlled drug delivery systems,)
12. Decarbonization and biopolymers
13. Sustainable environment and biopolymers

For each topic of the curriculum, a competence map will be created. which includes the learning outcomes, knowledge, and skills of the students, will be prepared by COSVITEC.

This result will guide PR2 and PR3. There are so many course materials and books about the biopolymers in EN. But the topics of these are specific themes such as biopolymer chemistry, nanocomposites, application in medical or environmental areas, physical properties. Moreover, there are very few materials/books on biodegradable plastics and their applications. There is no book written on experiments in the laboratory that can be used as a textbook at the university level, but also contains basic information. This result will form the backbone of the materials to be prepared in PR2 and the book to be written in PR3. The impact and transferability of the curriculum to be prepared with the contribution of real field data and analysis are very high.

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

- National Analysis reports
- International Analysis Report
- Industry Needs Report
- Curriculum
- Competence map

The quality indicators for PR1 will be

- Number of students and academicians answered surveys
- Number of industrial workers and firms answered surveys
- 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 suggestion)

4.1.3 WP3 Preparation of Open Access Training/Education Materials

WP3 includes three project results preparation:

- Interactive open-access education modules (PR2),
- Lecture Guidebook (PR3),
- VR exercises (PR4).

A task leader, co-leader, sub-tasks, activities, responsibilities, and timeframes were determined for each project result.

PR2- Interactive open access education modules

PAU will be the PRL. All partners will contribute to this result creation. University students, academicians, and the community are our target groups, respectively. Since the project partner institutions will create this online platform together, it is aimed to increase the digital competence and capacities of the project staff, also.

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.

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

PR3- Lecture Guidebook

SU will be the PRL. All partners will contribute to this output creation. 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 curricula 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 17th -18th 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 2nd TPM2 in Finland on the 6th 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 3rd and 4th 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:

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

PR4- Virtual Reality Exercises

CTRL Reality will be the PRL. All partners will contribute to this output creation. University students, academicians, project staff, and the community are our target groups, respectively. An innovative course curriculum will be created (PR1) to develop the knowledge and skills, revealing the gaps in current education.

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

4.1.4 WP4 Dissemination and sustainable implementation of the products

Dissemination and sustainable implementation of the products is the 4^{th} WP of FutureBio during the whole project life cycle. Dissemination plan as a draft version will be prepared by PAU and at 1^{st} TPM

it will be discussed by all partners. Necessary arrangements will be made on the plan in line with the opinions and suggestions of the partners. This plan will include all activities to be carried out during the project period for dissemination and sustainability.

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.

- 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.
- eTwinnig, Erasmus+ Project Results Platform, and EPALE 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 Işıtan 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.

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

4.1.5 WP5 Quality assurance of the products

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 TPM, 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.

QUALITATIVE AND QUANTITATIVE INDICATORS will be used to see the effectiveness of developed online modules, the pilot study was added to Project. With this regard, the project team and the users will be in constant contact and feedback will be provided.

- To achieve expectations, the definition/monitoring of specific project indicators will be used.
- To be more useful for the book, literature work and interviews will be made.
- To measure the quality and progress of the project as well as its success.

Quality indicators have been determined for each work package of the project and summarized below:

- Phase 1: Partnership evaluation surveys, Meeting evaluation surveys, number of activities, number of activities attended by project partners
- Phase 2: number of students, academicians, industrial workers, firms answered surveys
- Phase 3: number of students and academics attend the pilot applications, number of online tools and videos, number of tools to be changed, number of book chapters
- Phase 4: number of participants attend seminars / informative meetings / workshop / webinars, number of websites visiting, number of distributed newsletters / brochures, number of audiences of seminar / congress
- Phase 5: covers all the above-mentioned indicators to ensure the quality of the whole project. 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).

Quality assurance of the products will be valid for whole project term. All partners will take part in the organization of one of the webinars to be held on the project website. They will also make local company visits. Various promotional activities and poster competitions will be organized in high schools and secondary schools.

4.2 Responsibilities and Resources Allocations of Partners

FutureBio will be coordinated by PAU. SU, KLU, CNU, FBK, UNITN, COSVITEC, INDIVENIRE, OTHR, and CTRL will be partners, and SUPSI will be the associated partner. All the partners will contribute to all of the tasks. The project will present 4 project results, 5 transnational meetings (TPM), 7 informative meetings (IM), 2 training activities, and a workshop. All the activities and outputs will be done under 5 phases explained above. In these phases, the tasks of the partners can be summarized as follows:

- PAU will be the leader of PR2. PAU will contribute to the PR1, PR3, and PR4. All evaluation and testing materials will be developed, draft quality and dissemination plans will be prepared by PAU. PAU will support and attend to the C1 and C2 with 12 people. Additionally, PAU will support the organization of Dissemination activities and will prepare E1, since PAU has strong partnerships with both private sector and public bodies. PAU will organize the TPM1.
- KLU will organize the TPM5 and E8. KLU will contribute all of the outputs, especially PR2. KLU will attend C1 and C2 activities with 8 people. The evaluation reports at national and international level will be published as a special issue in the scientific journal of KLU. KLU will keep in touch with PAGDER & ASLAN and PAGEV which will be helpful during the preparation of industry needs reports and dissemination activities because of its role in the plastic sector.

- SU will be task leader of PR3. SU will contribute all the outputs, especially scientific manners. SU will attend C1 and C2 activities with 8 people and organize an IM (E5). Additionally, it has a good dialogue with the plastic producers in Konya, they will be a bridge to the university-industry practices and collaborations.
- CNU will be the task leader of PR1 with COSVITEC. CNU will organize E2. CNU will contribute to all the outputs. CNU will attend C1 and C2 activities with 7 people.
- CTRL will prepare the TPM2 and E3. It will be the output leader of PR4 and will contribute all outputs. CTRL will attend C1 activity with 1 person. Due to the wide range of digital material development experiences, it will also contribute to the preparation of online materials.
- FBK will organize the C1 and C2 training activities. FBK will contribute all the outputs. Since FBK has a strong relationship with industry, they will be a bridge between university and industry in the point of practices and collaborations. Due to the wide range of scientific research opportunities, it will contribute to the preparation of PR3 and online materials.
- UNITN will support FBK for training activities and it will prepare E6. UNITN will contribute all the outputs. Since it has huge scientific research experiences, it will also contribute to the preparation of books and online materials.
- COSVITEC will be the task co-leader of PR1 with CNU due to a wide range of experience on training, testing, and evaluation tools. COSVITEC will attend the C1 activity with 2 people. It will be the host institution of the TPM3 and will organize E4. COSVITEC will also contribute all of the outputs, especially PR2.
- INDIVENIRE will contribute all results, especially industry needs reports. It will support the FBK in training activities. It will also contribute to the preparation of books and online materials.
- OTHR will contribute all the outputs, especially scientific manners. OTHR will attend C1 and C2 with 8 people and will organize E7 and TPM4. Additionally, it has a good dialogue with the plastic producers in GE, they will be a bridge to the university-industry practices and collaborations.
- SUPSI will contribute to the preparation of curriculum and online materials. It will support the partnership about the platforms and programs that can be used especially in the preparation of online materials.

All partners will take part in the organization of one of the webinars to be held on the project website. They will also make local company visits.

The details of human resource allocated to different categories are presented in Table 3.

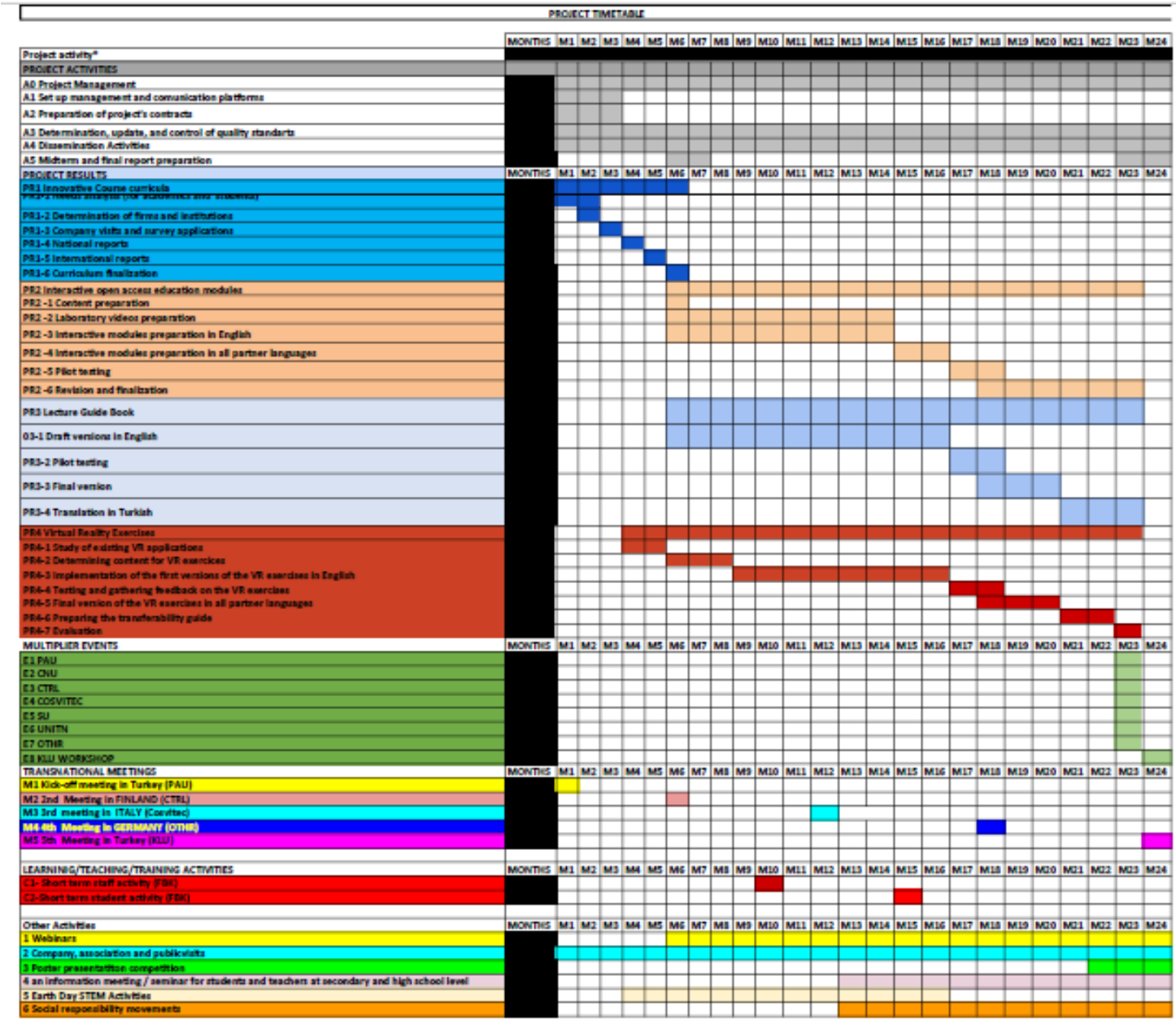
Table 3. Human resource allocated to different categories

Partner	Number of working days			
	Project Result1	Project Result2	Project Result3	Project Result4
PAU	20	90	70	15
KLU	15	40	30	10
SU	15	40	90	10
COSVITEC	30	40	20	10
FBK	15	40	65	10
OTHR	15	40	30	10
INDIVENIRE	5	30	30	10
CNU	50	40	30	10
UNITN	15	40	65	10
CTRL	5	40	5	85

4.3 Project Work Plan

To control the operation and progress of the project, the work plan, which was prepared during the project writing phase, was created in the form of a Gantt-chart (Table 4). During the project, this work plan will be followed and revised when necessary.

Table 4. Initial Work Plan for Project



5 Project Financial Management

All project results and activities of the project (including surveys, pilots, dissemination, impact, and sustainability) were determined by the project consortium during the preparation phase for a proper and fair budget sharing. In addition, all risks that may arise in the realization of these activities, especially COVID19, have been taken into consideration. The project aims to achieve 4 project results.

In accordance with FutureBio project objectives, assignments were made according to the expertise of the institutions. A team leader identified for each output and the roles in the project were distributed. The PR1, PR2, PR3, and PR4 will be led by the CNU with COSVITEC, PAU, SU, and CTRL respectively. The budget issues were discussed for each output and activities. The required working days for all outputs were calculated and added to the budget. All partners agreed on these issues. The coordinator and the other partners have many European Union projects. Those experiences will guide the project. The number of project activities including transnational project meetings (TPM1, TPM2, TPM3, TPM4 and TPM5), workshop (E8), training activities (C1 and C2), Information Meetings (E1-E7) were determined during writing process of the project with all partners. The number of participants that will attend those meetings and activities were foreseen, and the required costs were added to the budget for both national and international partners.

The project coordinator will prepare individual partnerships to be developed based on the grant agreement between the coordinator and the national agency. With these agreements, rights, tasks, budget, amounts of payments, timetable, and obligations for each partner will be defined. And, before the kick-off meeting, they will be sent to all the partners.

Transnational project meetings are very important to ensure project implementation and budget control. Before each meeting, the coordinator will request both progress and budget reports from the partners, including expenditure amounts in the last 6 months. During the kick-off meeting of the project, the purpose and objectives of the project will be clearly laid out to ensure that tasks are shared properly throughout the project. In the transnational meetings especially, the time management will be handled with care. Project phases, including start and end dates are predetermined and reached consensus with partners.

All partners will take part in the organization of one of the webinars to be held on the project website. They will also make local company visits. Various promotional activities and poster competitions will be organized in high schools and secondary schools. No extra budget was requested for the budgets required for these activities, and they will be carried out within the framework of project management and dissemination activities.

5.1 Unit Costs for Eligible Staff Costs

The entire project team will work in the Teachers /Trainers / Researchers category. Table 5 shows the daily working wages determined by the EU for each partner country.

Table 5. Unit costs for daily staff costs (EUR)

Country	Teachers /Trainers / Researchers
Turkey	74
Romania	74
Italy	214
Germany	214
Finland	214

A Monthly Time Sheet (MTS) ("diary of activities within the project for each task type") will be prepared for all project employees, apart from a document detailing their work on a daily basis. These documents will be shared by the coordinator to the partners and delivered by the partners to the coordinator before the interim report and before TPM5.

Employees of the project and the personnel who will benefit from the grant support must be employees of the institution.

5.2 Travel Costs and Individual support

Eligible travel costs and costs of stay cover the costs of travel and subsistence allowances of staff and students participating in activities directly related to the achievement of the project.

Travels are intended for the following activities:

- Transnational Project meetings,
- Teaching/training assignments,
- Updating program and courses,
- Practical placements in companies, industries, and institutions
- Workshop and visits for result dissemination purposes.

Furthermore, travel for research activities is not eligible.

5.2.1 Unit Costs for Travels

For project staff and students who will be involved in the applicable activities mentioned above, the grant contributes to the travel of them from their place of origin (home institution) to the venue of the activity and return. It includes visa fees and related obligatory insurance, travel insurance, and cancellation costs if justified (Table 6 and Table 7). If travel is necessary to obtain a visa, the relevant unit costs for travel and, if applicable, costs of stay can be claimed. The travel costs are calculated based on the travel distance of a one-way travel from their home institution to the venue of the activity. The distance can be determined at http://ec.europa.eu/programmes/erasmus-plus/tools/distance_en.htm. Since the reduction of the carbon footprint has become a horizontal priority for all Erasmus+ mobility activities, participants have been given the choice between regular travel support, with the same amounts as defined in decision C(2017)6864, and "green travel support" with increased levels of contribution when traveling by a low-emissions means of transport such as train or bus.

Table 6. Travel support (EUR)

Travel support- standard	
Travel distances	**Amount**
Between 10 and 99 KM	23 EUR per participant
Between 100 and 499 KM	180 EUR per participant
Between 500 and 1999 KM	275 EUR per participant
Between 2000 and 2999 KM	360 EUR per participant
Between 3000 and 3999 KM	530 EUR per participant
Between 4000 and 7999 KM	820 EUR per participant
8000 KM or more	1500 EUR per participant

Table 7. Green travel support (EUR)

Green travel support	
Travel distances	**Amount**
Between 100 and 499 KM	210 EUR per participant
Between 500 and 1999 KM	320 EUR per participant
Between 2000 and 2999 KM	410 EUR per participant
Between 3000 and 3999 KM	610 EUR per participant

5.2.2 Unit Costs for Individual support

For Transnational Project meetings, it is EUR 300 per person (575 EURO in total: 275 for travel+300 FOR individual support).

In C1, which is a short term staff training activity, there will be individual support of 106 EURO per person per day, with a total of 5 days of grant in the form of 3 days of training.

In C2, which is a short term student training activity, there will be 58 EURO individual support per person per day, with a total of 7 days of grant in the form of 5 days of training. The daily grant amount for Accompanying Persons who will participate in this activity will be 106 EURO.

5.3 Procedures for Reimbursement and Budget Transfer

After the first 40% of the budget transfer is transferred from the Turkish National Agency to the coordinator, the coordinator performs the first 40% money transfer of the partners, adhering to the bilateral agreements made between each partner and the coordinator.

After the interim report is accepted by the Turkish National Agency, the 2nd 40% budget transfer will reach the coordinator. After the completion of the expenditure reports and staff cost documents requested by the coordinator and sent by the partners, the coordinator will send the 40% transfer to the accounts of the partners.

The final report will be uploaded to the system by the coordinator within 2 months after the project period is completed. After the final report is accepted by the Turkish National Agency, the remaining 20% of the budget will be transferred to the coordinator. The coordinator will send 20% of all partners' budgets to all partners in accordance with the finalized and approved expenditure items.

6. Project Internal Communication

The partnership has good communication among all project partners. PAU, SU and KLU from TR; CNU from RO; UNITN, FBK, INDIVENIRE, and COSVITEC from IT, OTHR from GE, and CTRL Reality from FI will take place in this partnership.

Scientific and academic knowledge, industry experience and institutions producing innovative educational technologies were brought together at FutureBio. PAU, KLU, SU, FBK, UNITN,OTHR, and CNU will form the scientific basis, INDIVENIRE will contribute by sharing industry practices and field experiences, and CTRL Reality will guide the team in preparing digital training materials. The partner selection has been completed, taking into account the past and present project execution and completion experiences: A KA203 project has been completed successfully by PAU, SU, FBK, CNU, and

COSVITEC. A KA202 project has been completed by PAU and SUPSI (as associated partner). A KA204 project is still going on by PAU, KLU, CNU, and COSVITEC. Student and staff lecturing and internship activities between PAU and OTHR, which have been continuing effectively for many years, are carried out without any problems.

A management team was formed by choosing one person from each of the project partners: A Işıtan, Evren Çağlarer, Yasemin Öztekin, Gratiela Dana Boca, Aniello Gervasio, Alessandro Pegoretti, Massimo Bersani, Laura Pasquardini, Teijo Lehtonen, Charlotte Thiel, and Nadia Catenazzi. These people will be responsible for management, implementation, monitoring and quality on behalf of their organization.

A Google Group and Google Drive folder named "FutureBio" was created by PAU to write the project proposal and to share information among partners. The partnership has also Whatsapp and Skype communication.

PMT will ensure the control and coordination of the project in terms of time and outcomes through 5 transnational meetings, which we will hold during the project (M1-M5). In order to maintain this good communication in the following processes, we will use Google Group, Google Drive, Whatsapp, Skype, and Facebook. In this sense, the division of labor decided by the entire project team, with the opinion and approval of each partner, is important. Each task leader and all partners in charge know the responsibility, duty and rights they have in the realization of the project results and activities. Apart from the project partners' qualifications to execute and complete projects together, all partners have good communication. This communication helped us to do preliminary needs analysis together during the project preparation phase and will continue throughout the project. In this context, after the consensus in the project preparation phase, when the project is awarded a grant, bilateral agreements will be made between the coordinator and the partners, which include the tasks and responsibilities and the budget of each partner. All processes will be carried out transparently.

7. Project Risk Management

The partnership does not foresee the separation of our partners since it has already completed EU projects together. For eliminating the risks, project partners who work on polymers, biopolymers, online training material creation, and training material development take part in our project. However, during the Project's coordination and implementation phase, undesirable disruptions may occur, for example due to the pandemic diseases delays may be occured. In such a case, the changes that can be made will be shared with the partners after the approval, by keeping in touch with the experts and coordinators in the Turkish National Agency.

In addition, progress regarding Covid19 will be followed closely during the entire project period. All the problems and risks that may occur due to Covid19 were discussed by the partners during the project preparation period and the necessary measures were added to the project. A strong online communication network has been established, especially in case of non-realization of transnational meetings. In case of travel restrictions, it is planned to hold meetings online until the restrictions are lifted, and to be held face-to-face after the restrictions remain. If conditions are severe when informative meetings are to be held, these meetings will either be completed in small groups or will be held online. All the risks have to be minimized with a second plan.

5 transnational meetings (M1- M5) in every 6 months will be organized by attending all partners' coordinators of the project. The partnership will establish procedures to identify potential risks and to handle these effectively. In case the project meetings cannot be held on site, we will be able to conduct the meetings without delay, as we have created the necessary online infrastructures. The potential risks

for FutureBio project are: conflict between partners, slippage on timetable, failures by one or more partners to deliver agreed activities, being unable to provide expected audiences in project events. PAU before the kick-off meeting (M1) will prepare a risk analysis and will present it at M1: to determine possible risks to evaluate the risks to identify preventive or corrective measures. The partnership will make evaluation reviews at each bimonthly online project meeting. Then the partnership will identify and agree further action to resolve or act on risk situations if necessary. Risks that may arise from COVID19 are also anticipated and all project partners have agreed on the measures to be taken against these risks:

-Transnational meetings not being held on time: In case there are no suitable travel conditions and limitations due to Covid19, the meetings are planned to be held online until suitable conditions occur. After the appropriate travel conditions and restrictions are lifted, face-to-face meetings will be held.

- Failure to hold information meetings face to face: Since the situation will be evaluated continuously throughout the project, if there is the situation that informative meetings cannot be held face to face, two separate plans have been considered:

1. Reaching the total number of people by doing more than one activity with very few people

2. Online participants have been added to the budget of the informative meetings. If not done face to face, these activities can be completed online.

8. The Deliverable Templates

The templates developed for serving the purpose of the project results are described in the following table and can be found as annexes:

1. Work Package Monthly Report: Monthly reports from Task leaders will be compiled into a single report by the work package officer in the coordinating institution and shared with all partners.

2. Project Result Monthly Report: Monthly reports from task leaders will be compiled into a single report by PROJECT RESULT leaders and shared with the coordinator and all partners.

3. Monthly Time Sheet: It will be filled in on a monthly basis for each staff member involved in the project and will be shared with the coordinator after it is approved by the legal representative.

4. Staff Time Sheet: The project results for each personnel involved in the project will be completed and shared with the coordinator after they are completed and approved by the legal representative.

5. Meeting Minutes Report

6. Meeting Attendance Sheet

ANNEXES

Annex 1: Work Package Monthly Report

Work Package Monthly Report

Title and reference number of the work package (WP)		
WPL:	Reporting period:	Completion date:

Activities carried out since last report to date:

Task No*	Task Description	Start date	Due date	Place/Partners involved	Description of the activity carried out	Specific and measurable indicators of achievement	Implementing status (done, partially–? [%])
Task x.x							
Sub Task							
x.x.y							

*If a task contains several activities, please divide it to subtasks and report the progress of both the task and its subtasks.

Corrective Actions **

Task No*	Task Description	Details
Task x.x		
Sub Task		
x.x.y		

*If a task contains several activities, please divide it to subtasks and report the progress of both the task and its subtasks.
**Only when corrective actions are needed.

Activities to be carried out for the next month:

Task No*	Task Description	Start date	Due date	Place/Partners involved	Description of the activity carried out	Specific and measurable indicators of achievement	Implementing status (done, partially–? [%])
Task x.x							
Sub Task							
x.x.y							

*If a task contains several activities, please divide it to subtasks and report the progress of both the task and its subtasks.

Complete Activities to date:

Task No*	Task Description	Start date	Due date	Place/Partners involved	Description of the activity carried out	Specific and measurable indicators of achievement
Task x.x						
Sub Task						

x.x.y						

** For a completed task containing subtasks, please report only the task.

Progress of Deliverables

Deliverable No	Deliverable Description	Status (Y/N)		
		Prepare	Submit to EC	Officially Complete

Indicators

Indicator of achievement and or/performance as indicated in the project proposal	Target	Sources of information on indicators	Measured Results	Measured Date	Observation

Changes that have occurred in this result since the original proposal:

Annex 2: Project Result Monthly Report

Project Result Monthly Report

Title and reference number of the Project result (PR)		
PRL:	Reporting period:	Completion date:

Activities carried out since last report to date:

Task No*	Task Description	Start date	Due date	Place/Partners involved	Description of the activity carried out	Specific and measurable indicators of achievement	Implementing status (done, partially–? [%])
Task x.x							
Sub Task							
x.x.y							

*If a task contains several activities, please divide it to subtasks and report the progress of both the task and its subtasks.

Corrective Actions **

Task No*	Task Description	Details
Task x.x		
Sub Task		
x.x.y		

*If a task contains several activities, please divide it to subtasks and report the progress of both the task and its subtasks.
**Only when corrective actions are needed.

Activities to be carried out for the next month:

Task No*	Task Description	Start date	Due date	Place/Partners involved	Description of the activity carried out	Specific and measurable indicators of achievement	Implementing status (done, partially–? [%])
Task x.x							
Sub Task							
x.x.y							

*If a task contains several activities, please divide it to subtasks and report the progress of both the task and its subtasks.

Complete Activities to date:

Task No*	Task Description	Start date	Due date	Place/Partners involved	Description of the activity carried out	Specific and measurable indicators of achievement
Task x.x						
Sub Task						
x.x.y						

** For a completed task containing subtasks, please report only the task.

Progress of Deliverables

Deliverable No	Deliverable Description	Status (Y/N)		
		Prepare	Submit to EC	Officially Complete

Indicators

Indicator of achievement and or/performance as indicated in the project proposal	Target	Sources of information on indicators	Measured Results	Measured Date	Observation

Changes that have occurred in this result since the original proposal:

Annex 3: Monthly Time Sheet

2021-1-TR01-KA220-HED-000032160
Let's use biodegradable plastic for the future

Month/Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Toplam
08.00-09.00																																0
09.00-10.00																																0
10.00-11.00																																0
11.00-12.00																																0
13.00-14.00																																0
14.00-15.00																																0
15.00-16.00																																0
16.00-17.00																																0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Institution Project Coordinator | Staff | Legal Representative

Annex 4: Staff Time Sheet

Staff Time Sheet

Project Number	
Project Title	
Institution	
Name of employee	
Staff Category*	
Period** (Start date of PR – End date of PR)	

Month / Year	Description of Activities	Days
	PR1:	
	Total Days	

Employee Signature: …… Date: ……

Employer Signature: …… Date: ……

Employer Name: ……..

***Staff Category:** The applicant will estimate the staff workload required on the basis of the category of staff concerned and the number of days to be worked on the project, in relation to the outputs. Working days might include week-end, obligation and bank holidays. For the sake of estimating the budget, working days per indi-vidual will not exceed 20 days per month or 240 days per year. The estimation

of the budget results from applying Eras-mus+ contribution to unit costs for staff. It is independent from the actual remuneration modalities that will be defined in the partnership agreement and implemented by the beneficiairies.
The profile of staff involved in projects is grouped in four categories:
Managers (staff category 1) (including legislators, senior officials and managers) carry out top managerial activities related to the administration and coordination of project outputs.

Researchers, teachers and trainers (RTT) (staff category 2) typically carry out academic activities related to curriculum/training programme development, development and adaptation of teaching/training materials, preparation and teaching of courses or trainings.

Technical staff (staff category 3) (including technicians and associate professionals) carries out technical tasks such as book-keeping, accountancy and translation activities. External translation services and external language courses provided by sub-contracted non-consortium members should be classified as "Sub-contracting costs".

Administrative staff (staff category 4) (including office and customer service clerks) carries out administrative tasks such as secretarial duties.

** **Period:** The creation of the output date-range

Annex 5 Meeting Minutes Report

Meeting Minutes Report

Meeting Subject:			
Date of Meeting:		**Time:**	
Minutes Prepared by:		**Location:**	
1. Attendance at Meeting			
Name		**Institution**	
1.			
2.			
3.			
2. Purpose of Meeting			
3. Meeting Agenda			
4. Meeting Notes, Decisions, Issues			
5. Action Items			
Action		**Assigned to**	**Due Date**
6. Attachments (documents/handouts to bring, reading material, etc.)			
Description		**Prepared by**	
7. Next Scheduled Meeting			

Annex 6 Meeting Attendance Sheet

FUTUREbio

……MEETING ATTENDANCE LIST

Meeting Host Institution:

Meeting Location:

Meeting Date:

Name and Surname	Institution	e-mail	National ID	Date