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LAYMAN REPORT

Let's use biodegradable plastics for the future

FUTURE**bio**

FUTUREBIO
PROJECT

Project Number: 2021-1-TR01-KA220-
HED-000032160

Project Name: "Let's use biodegradable
plastics for the future"

Abbreviation: FutureBio

Coordinating beneficiary: Pamukkale
University

Associated beneficiaries: Selçuk Uni-
versity, Kırklareli University, Fondazio-
ne Bruno Kessler, Cosvitec Societa
Consortile Arl, Universita Degli Studi Di
Trento, Indivenire srl, Universitatea
Technica Cluj Napoca, CTRL Reality Oy,
Ostbayerische Technische Hochschule
Regensburg, University of Applied Sci-
ences of Southern Switzerland (as as-
sociated partner)

With the support of: Turkish National
Agency

Description

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Let's use biodegradable plastics for the future

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.

Introduction

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 In the EU as recycled In the 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.



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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 aimed to improve capacity and flexibility in education by making digital tools. The project is applied the most innovative training technologies based on E-LEARNING tools with LABORATORY VIDEOS and animation applications in game format and VIRTUAL REALITY tools that contribute to improve the trainees' motivation and engagement. The learning material is 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.

OBJECTIVES

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



OBJECTIVES

In a summary, the objectives of the FutureBio project include:

** Supporting the setting up of, and access to, upskilling pathways*

** Improving and extending the supply of high-quality learning opportunities tailored to the needs of all target groups*

** Open education and innovative practices in a digital era*

** Both the figures put forward by the European Union and European Commission reveals the importance of taking urgent and effective measures and developing strategies in this regard*

Within the scope of the FutureBio project;

- * *A detailed field study was carried out.*
- * *A detailed book and online application research were conducted.*
- * *Surveys and pilot studies were conducted to determine the needs of university students, academicians, industrial workers, and high school students.*
- * *As a result of all studies, SWOT analysis of the project was made.*
- * *A cross-cultural analysis of knowledge and needs between partner countries was conducted.*
- * *Book chapters and online laboratory videos topics were determined according to the needs of the target groups.*
- * *The content of the e-learning materials and VR tools were determined according to the needs of the target group as a result of these research.*
- * *A guide for the use of the VR application has been prepared.*
- * *A training activity (C1) was organized for the staff of the partner organizations in cooperation with the Bruno Kessler Foundation, Universita Degli Studi Di Trento, and Indivenire srl.*
- * *A training activity for students of the partner universities (C2) was organized in cooperation with the Bruno Kessler Foundation and Universita Degli Studi Di Trento, and Indivenire srl.*
- * *Information meetings were held in partner countries for high school and university students and participants with different levels of education.*
- * *Students who received these trainings participated in various national and international competitions with their project ideas and achieved successful results.*
- * *"Nano Zinc-Oxide Boron Doped Biodegradable Polymer Fire Extinguishing Ball and Its Production Method", one of the ideas developed by the project team within the scope of the project, was applied for a patent and won an award.*

Repercussions

The website has been up and running since March 2022 in English and partner country languages.

Website address: www.futurebioproject.eu

The content is regularly updated. The website will remain active as a tool for publicising the project, as well as a download centre for all the information and results generated by the FutureBio project during next five years.

Within the scope of the project, consortium carried out various promotional activities in high schools and secondary schools to increase impact: In high schools and secondary schools, activities have been organized such as art competition and poster presentation. Earth day STEM challenge activities were organized to reach young people with activities at the secondary and high school level, which was held locally in especially Italy, Romania, and Turkey.

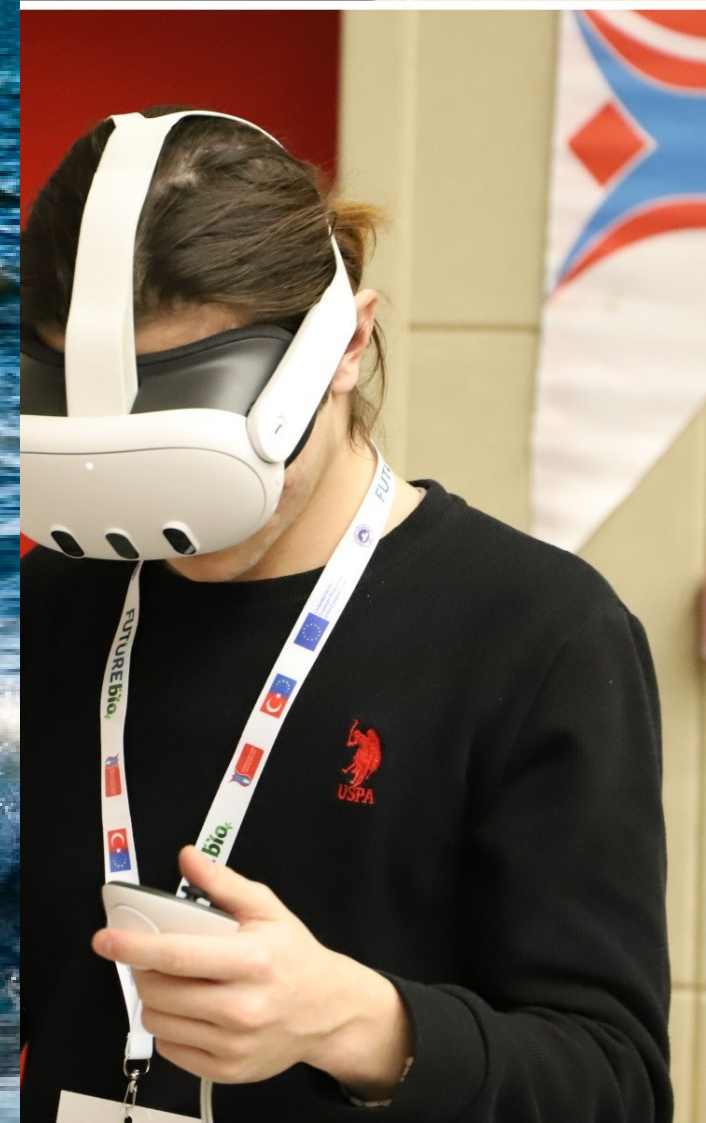
A poster competition was organized in Germany.

Social responsibility movements such as collecting plastics etc. were initiated.

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Within the scope of June 5 Environment Day activities, a painting and assemblage contest was organized with the participation of 40 schools across the province in cooperation with Kirklareli University and Kirklareli Provincial Directorate of National Education. At the school, our students were first shown a video containing information about the degradation processes of plastics in nature and biodegradable plastics. Then the painting contest was announced.

Fondazione Bruno Kessler, Università Degli Studi Di Trento, Fondazione Bruno Kessler, Università Degli Studi Di Trento, and Indivenire srl participated in **EDUCA: TOWARD A NEW SCHOOL** (education festival) event held in Rovereto/Italy on 14-16 April 2023 with 13 posters.



On the February 5th 2024, an international panel titled "**Sustainability and bioplastics in the plastics industry**" has been organized at Kırklareli University with the participation of Vice Governor of Kırklareli.

The panel was chaired by Prof. Dr. Cem GÖK, Head of Biomedical Engineering Department of Izmir Bakırçay University, and the following scientists and institutions took part as panelists:

Prof. Dr. Alessandro PEGORETTI (University of Trento)

"Biopolymers and their importance (an overview)"

Assoc Prof. Dr. Gratiela Dana BOCA (Technical University of Cluj Napoca)

"Biopolymer industry in economic perspective"

Prof. Dr. Ülkü SAYIN (Selçuk University)

"Biopolymer production and utilization in different sectors"

Assist. Prof. Dr. Lecturer Gülcan İNER (Kırklareli University)

"Use of biopolymers in architecture and construction sectors"

Timo Korkalainen (CTRL Reality)

"Industrial XR training platform"

You can follow and access the project outputs and news via our website:

<https://www.futurebioproject.eu/>

FutureBio Project Instagram page: [@futurebioproject](https://www.instagram.com/futurebioproject)

FutureBio Project YouTube channel: [Future Bio](https://www.youtube.com/channel/UC...)

For all kinds of questions and information: futurebio@pau.edu.tr



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