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BIOWAYS
Bio-based economy: network, innovate, communicate

D3.3 Development of the training content

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1. EXECUTIVE SUMMARY

This deliverable describes the process adopted to collect the material to be used to develop the educational tools under Task 3.4.

The procedure has been organized in the following way:

- **Target groups:** this section describes the target groups of users that have been chosen and addressed for the collection of the material to be further developed into the educational tools
- **Contents and source of material:** this part refers to the topics and issues related to bio-based products and the bioeconomy for which material has been collected
- **Educational tools:** this section briefly outlines the tools that have been planned and will developed under T 3.4 by using the material collected under T 3.3.

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2. INTRODUCTION

This deliverable was prepared under Task 3.3 “Development of the training content” of the BIOWAYS project. The overall aim of this document is to describe the process adopted to collect the material to be used to develop the planned educational tools (T3.4).

Informing the general public and raising their awareness of bio-based products, with a specific focus on young people, is widely recognised to be a key action in supporting an effective transition towards a successful bioeconomy and in facilitating market uptake of bio-based products. This approach has been supported by the European Commission’s Expert Group for bio-based products “Working Group 'Awareness Raising” , and highlighted by several surveys on consumer perception of bio-based products.

3. TARGET GROUPS

The first step BIOWAYS has taken in this process has been the identification of the main target groups and an assessment of the level of information they have. According to the discussion amongst partners at the project kick-off meeting and also following discussion with partners from other projects already involved in dissemination and communication initiatives about the bioeconomy and bio-based products that are actively cooperating with BIOWAYS through joint initiatives and events (i.e. BIO-STEP, STAR-ProBio, BIOCANDO, ISAAC, ProBIO, TECH4EFFECT, BioLinX, InnProBio, RRI-Practice, SIM4NEXUS, SOILCARE, OPEN-BIO, BIOVOICES, etc… the decision was made to address the informative material and tools to be developed in T3.4 to non specialists, and namely:

- children
- teenagers, families and adults with no specific knowledge of the topic

The main reasons why these two groups were identified as the most relevant ones for this activity are:

- Children represent future generations and therefore their training will ensure their approach to everyday life is built on being aware of environmental concerns and how to deal with them. They are curious and their sensitivity to the environment is very high, especially if they are informed and made aware of the challenges we face.
- Teenagers and adults are citizens who are currently actively involved in the economy and, if properly informed about the advantages of bio-based products, they could change their habits and start using bio-based products in their everyday life in medium to short-term.

University and PhD students are also a target group and considered important to the success of the BIOWAYS project. However, it was decided that they would not be directly addresed as

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many academic B.Sc., M.Sc. and PhD courses and programmes provide students with specific and deep knowledge, and even practical experience, within the disciplines related to the bioeconomy and bio-based products (e.g. economy, agronomy, biotechnology, engineering, food science and technology).

4. CONTENTS AND SOURCE OF MATERIAL

Once the main target groups were identified, the contents of the training tools and the messages they contained were defined. According the results of a survey conducted under T2.2 on the public perception of bio-based products (D2.2), 29.6% of the respondents felt sufficiently aware about bio-based products, while a significant percentage (32,3%) cannot estimate their level of awareness.

The primary topic considered for the training tools was, therefore, the "*bioeconomy*" in order to provide our target groups with some basic information to some of the common questions the general public have . These include:

What is the bioeconomy?

Why this strategy was set up?

Is it already active?

How is it supported/developed at EU level?

How is related to our everyday life?

How can affect our society, environment and economy?

Other content has also been set in accordance with the *bio-based product categories* and the main *application areas* identified within the project and considered in WP2 for the analysis of the current market situation and future potential of bio-based products and the bioeconomy. In fact according to the outcomes of the report (D2.1), all the product categories listed below offer opportunities for end-products/services that are already developed in industrial environments, some at a large scale:

- Bio-based chemicals and building blocks
- Bioenergy and biofuels
- Bioplastics/ biomaterials
- Bio-based food and feed ingredients
- Biosurfactants
- Biolubricants

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For each product category, information has been collected in order to describe:

What the specific bio-based product is

What is it used for

How it is produced, compared to its fossil-based equivalent

The pro and cons of the bio-based product compared to its fossil equivalent

"Success stories" were identified in each category that presented :

- practical examples of bio-based products already available on the market
- positive effects of bio-based products
- examples of local bio-based resource exploitation and rural development
- the impact of bio-based products on employment and re-industrialisation.

In this context also some "*champion feed-stock product*", which are characterised by a wide number of applications in different sectors, have been used as effective examples of bio-based value chains and opportunities.

An additional issue that has been considered extremely important is related to "*common errors and misunderstandings*" highlighted by the BIOWAYS on-line survey (D 2.2) and also evidenced during discussions with representatives from other projects (particularly STAR-ProBio and InnProBio) involved in dissemination and communication activities about bio-based products.

In order to overcome this barrier, a specific educational section has been planned to provide simple definitions and to clarify the differences between definitions for bio-based, biodegradable, compostable, sustainable and organic products amongst other terms.

Another relevant aspect, which has also been considered is *life cycle of some bio-based products*, relating to examples of their origin/end-of-life/proper consumer behaviour.

The material to be used as content for the training tools has been provided, collected and chosen from:

- the documents already available from the literature review performed under WP2

- collaborations established between BIOWAYS and other relevant EU-funded projects. This ensures a wider diffusion and valorisation of content developed by other projects, thus enabling a better exploitation of EC funding.

- direct contact with researchers and coordinators of relevant projects (also, but not only, in the context of activities performed under T2.3) or experts in the specific research areas

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- the screening of the EU Cordis portal (http://cordis.europa.eu/projects/home_it.html) of relevant projects and direct search of results and outcomes of project web-sites

- contacts with companies producing bio-based products.

Overall, the documents and material collected to date, mainly include official reports, fact sheets, facts and figures, scientific papers, and presentations given at public events. Almost all the documents are public, while those documents that were not directly available to the public, an agreement has been established with the owner for its use on a collaborative basis.

In order to present the benefits of bio-based products and the opportunities they offer, some among all the examples collected for each product category have been selected for the educational tolls. The basic criteria considered for this choice have been to provide an overview of the possibilities different feedstock present, application areas, current production at industrial scale and, when possible, future opportunities foreseen for some outputs and results currently being developed at the research level.

5. EDUCATIONAL TOOLS

The main idea of the BIOWAYS project is to deliver messages and informative material through innovative tools, mainly in the form of games and gamified tools, in addition to some more traditional tools, i.e. educational videos and presentations.

So far, two games have been planned and one is currently being used by children and being presented at BIOWAYS events. This is known as the “Bio . . What?” game.

- “*Bio...What? The bioeconomy game*” was developed for children (Figure 1). The basic idea of the game is that players find and collect natural resources and match them with the final bio-based products these resources produce. Once the correct association is found, more information about the bio-based product and the related advantages is provided. The first version of the game was delivered in mid-September 2017 and has been tested during planned events (e.g. Researchers Night at the end of September in Italy and Portugal, and a seminar for students in mid-October in Italy). It will also be presented and played with at future events.

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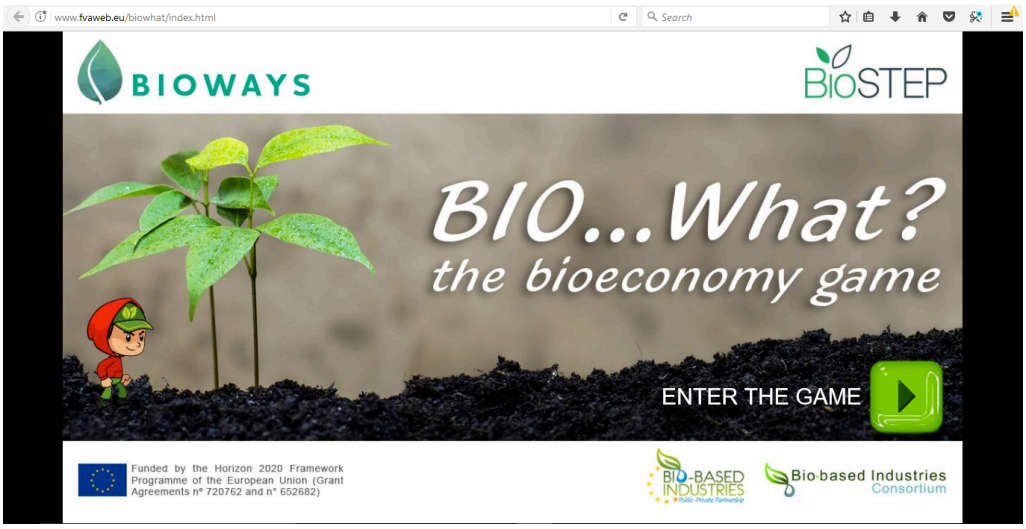

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- **Figure 1: Screen shots of "*Bio...What? The bioeconomy game*".**

- The first test of the game was very successful: At the Researcher's Night in Italy (Roma, Bologna, Cesena IT and Aveiro PT) the game was played by at least 500 children in two main deployment solutions:

  1) Group sessions during two school workshops, during which one group was playing, while the other group guessed the answers). The groups swapped roles every time they made an error. Enthusiastic feedback was gathered and the children were very interested. Several children played in parallel on their mobile phones. Printed material, with the link to the game online, was also distributed. The age range was from 10 to 16 years.

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Figure 2: Picture from the Researchers' night in Rome (school activities)

2) Individual playing session during the Exhibition (at the BIOWAYS exhibition booth). Three tablets were provided to enable single players individual game sessions. The children were playing continuously for the entire duration of the exhibition, from 5pm to midnight on the 29 and 30 September.

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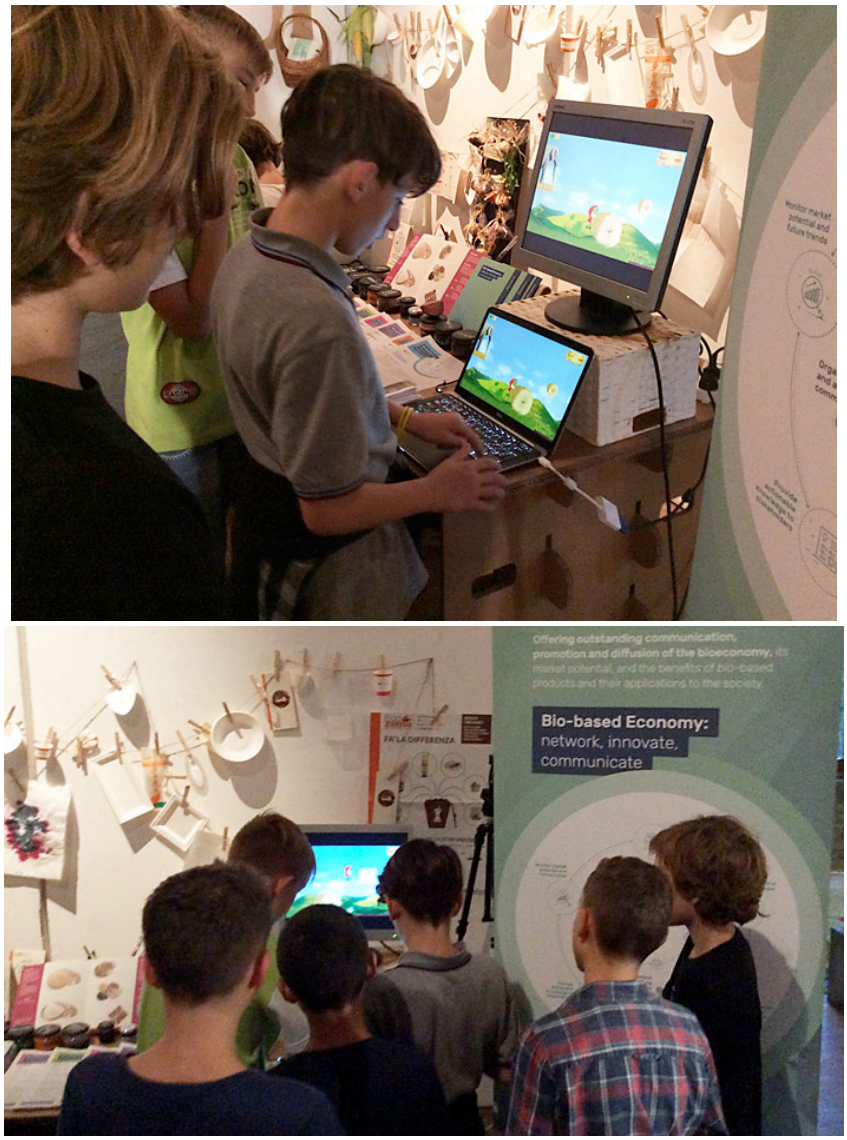

Figure 3: Pictures from the Researchers' night in Rome

- A quiz is to be developed for teenagers and adults to highlight the clear differences in terminology, between concepts such as "bio-based, biodegradable, compostable, sustainable, organic products" For the design of this game, collaboration with the projects STAR-ProBio and InnProBio has been initiated. The content will be produced by integrating the insights provided by the 3 projects BIOWAYS, STAR-ProBio and InnProBio. The game will be structured as a quiz, to challenge the players with several questions addressing the most common misconceptions of the bioeconomy and bio-based products. Depending on the way the game is designed, it is likely that the players will be "trapped" into the most common misunderstandings. This approach has been successfully used by the partner expert in serious games design (FVA) in several projects (funded by the EC and by companies), like, for instance, the GUESSH! game (developed for the DANDELION project).

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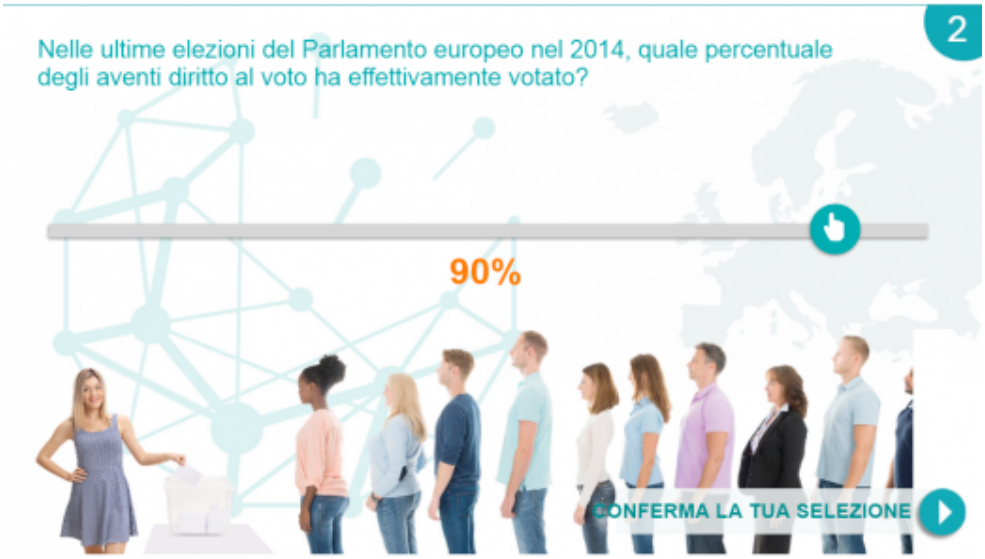

- **Figure 4: Screen shots of the game "GUESSH!", developed by the DANDELION project. The second BIOWAYS game will use the same logic**

Learning-by-errors is a strategy that is increasingly used in serious games for training. This approach leverages "safe failure" as a way of consolidating the learning (and the behavioural change). In addition to that the game delivers the knowledge in a playful way.

Educational videos will be prepared by interviewing researchers about promising results and applications related to bio-based products, as well as interviews with other stakeholders who will present their success stories about bio-based production processes at the industrial scale.

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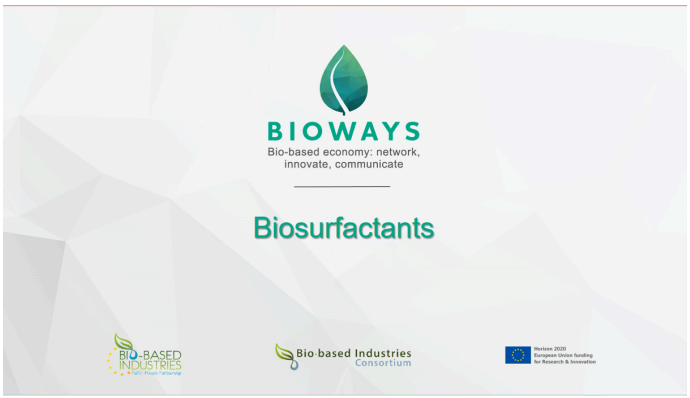
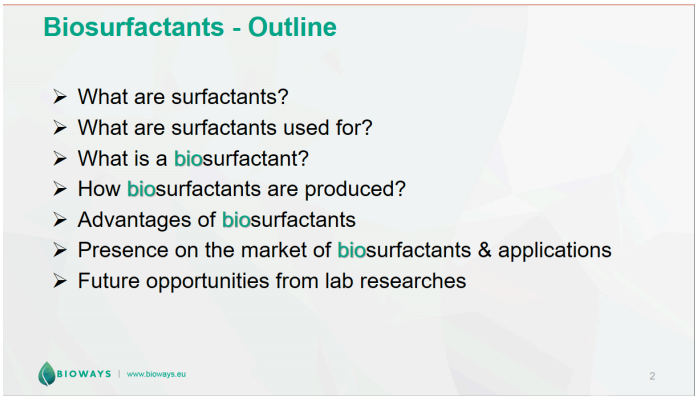
For the production of these videos, several research centres (La Sapienza University, CNR, Enea - BIOAG, Bologna University, Napoli University, Bari University), Associations (Cluster SPRING, Chimica Verde Bionet, Euroagrumi Consortium, Consorzio biogas, Azzero CO2) and companies (Novamont, Biochemtex, Ecozema, Minimo Impatto, TurBliss) have been involved and the first video shooting will start in the beginning of October.

The *educational presentations*, for product categories and application areas already investigated in WP2, are currently under preparation. The outline of the content and some slides. for biosurfactants are shown as an example in Figure 2.





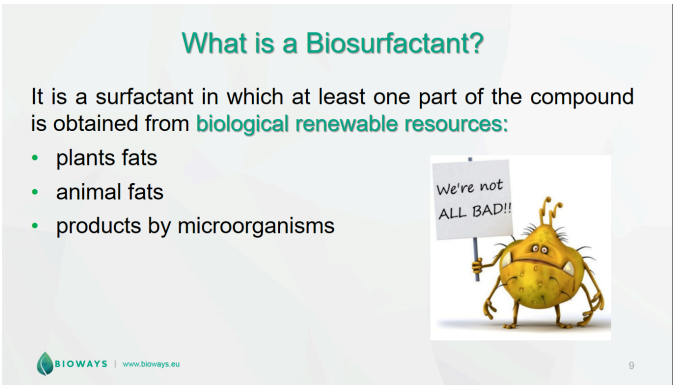


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Figure 2: Screenshots of some slides of the presentation on biosurfactants.

5.1. FUTURE ACTIONS

All the educational tools which will be delivered by M14, will be tested during all the relevant events organized by BIOWAYS partners or events where the project partners will attend, in order to collect feedback on: i) their efficacy in improving user knowledge and awareness about current and future opportunities related to bio-based products; ii) suggested improvements and other interesting content that could be added to subsequent versions of the tools.

Beside this activity, a sort of "monitoring action" will be continuously made by the BIOWAYS partners to collect possible updates and follow-ups in on-going research to identify additional

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material produced by other EU projects recently started or those that were at too-early a stage to provide any interesting outcome for the first tools.

Moreover, additional collaboration with relevant initiatives and organisations will be promoted to enable the creation of additional training content and tools.

All the information collected will be used during the second year of the project lifespan to refine the tools and update their content.

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