



*Horizon 2020 Work programme*

Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research and the Bioeconomy

*Call*

H2020-FNR-2020: Food and Natural Resources

*Topic name*

FNR-16-2020: ENZYMES FOR MORE ENVIRONMENT-FRIENDLY CONSUMER PRODUCTS

*FuturEnzyme:*

Technologies of the Future for Low-Cost Enzymes for Environment-Friendly Products

Final ID: 101000327

31/05/2024



# D8.12\_SHORT PROMO VIDEO OR COMIC

D8.12

MANUEL FERRER

CSIC

MARIE CURIE 2, 28049 CANTOBLANCO, MADRID, SPAIN

## Document information sheet

<b>Work package:</b>	WP8, Communication, Dissemination and Exploitation
<b>Authors:</b>	CSIC (Manuel Ferrer, Patricia Molina)
<b>Document version:</b>	2
<b>Date:</b>	31/05/2024
<b>WP starting date:</b>	01/06/2021
<b>WP duration:</b>	48 months
<b>WP lead beneficiary:</b>	ITB
<b>WP participant(s):</b>	CSIC as main contributor and all partners for providing feedback and suggestions for implementation
<b>Deliv lead beneficiary:</b>	CSIC
<b>Dissemination Level:</b>	Public
<b>Type</b>	Websites, patents filling, etc.
<b>Due date (months)</b>	24 (reopened month 36 for update)
<b>Contact details:</b>	Manuel Ferrer (mferrer@icp.csic.es), Patricia Molina (patricia.molina@icp.csic.es)

## Summary

History of changes .....	4
Short promo video/ comic.....	4
1. Scope of deliverable .....	4
2. The making of.....	4
2.1. Video.....	4
2.2. Comic .....	6
3. Presentation Venues for the Video and Comic .....	7
4. Conclusion .....	7
Annex.....	8

## History of changes

Version	Publication date	Changes/Comments
1.0	30.05.2023	Initial version
2.0	30.05.2024	Comments on delivery date Changes made from the planned script to the final video Addition of the presentation venues of the comic and video Addition of the produced comic and links to the video and comic

## Short promo video/ comic

### 1. Scope of deliverable

This deliverable consists in at least one short promo video and a comic to maximize the FuturEnzyme dissemination, exploitation and communication impact towards a broad audience. This material will be available through the website, as well as through all communication and dissemination channels established during the project.

### 2. The making of

The idea is to produce divulgative materials in which we present FuturEnzyme's moto, workflow and targets. This deliverable has suffered a slight delay of around two months. It was consulted to the Project Officer, who accepted it. In the case of the video, it was complicated to find a company to fit the budget with the idea we wanted for the video. Finally, we have found a nice solution that combines quality and a suitable price (so that to respect the principle of best value for money when outsourcing this service). The idea of adjusting the budget was also considered with the idea of producing several videos over the life of the project. Regarding the comic, agenda issues have prevented us to start sooner. In both cases, a script was set months in advance.

#### 2.1. Video

Our aim was to produce a realistic animated video, understandable by a wide audience, from experts to non-experts, including high school students, the general public, stakeholders, and more. After a thorough search we have found Design Cells ([@design\\_cells](#)), who creates very realistic and science-precise videos with an impressive relation quality/price. The work officially started on April 2023, with the first part approved for high-resolution production at the end of May 2023.

The video lasts 3 minutes 30 seconds, and is divided in 5 parts that can be later combined separately, for instance, to make posts in social media. The script of the video, revised during the production process and approved by all partners, is as follows:

#### **Part I. Intro**

Today's world: climate change. Images of a contaminated landscape.

*Text/voice: How to revert this while keeping our way of life? Nature provides a solution.*

Images of environmental sites from which microorganisms can be isolated, their genomes sequenced and analysed by supercomputers to identify the enzymes we search for, which can be later synthesized, produced and tested. After that, the images created for our project showing our three target sectors: textiles, detergents, cosmetics.

*Text/voice: Microorganisms and the enzymes found in their genomes can be bioprospected and computationally analysed to disclose those that can be of interest for green applications, bioeconomy and*

*circular economy. Enzymes are natural molecules that perform all the amazing reactions that allow life, so we can learn from them to “pamper” the Earth.*

*Text/voice: Come with us to see how we can help to make the world green again*

## **Part II. Textiles ~25 seconds**

*Note: For **textile**, the utilization of enzymes in the textile production unit can have an effective impact to save energy, time and water and reduce CO<sub>2</sub> emissions in three steps, namely, the removal of the spinning oils during the solvent cleaning step, the removal of the dyes after the dyeing/fixing of the textile materials, and the degradation of textile waste after the end-use. The textile’s complexity, in the base material used and different oils & dye recipes & variants in color, make it quite complex to find only one enzyme in their removal and discoloration and neutralization of the wastewater.*

Zooming from a textile production unit to the textile image into the clothes: an enzyme that once dissolved in water can remove the spinning oils and dyes that remains in the surface of the textile materials during the different processing steps. Then, it is showed how at the end of life of the garment, our enzymes can degrade the textiles to avoid their accumulation in the environment.

*Text/voice: In the textile manufacturing, compounds such as spinning oils for processing and dyes for coloring are complicated to remove from the final garment, needing a big amount of water and energy for its heating. Enzymes can remove those, avoiding such a high utilization of water and energy. Moreover, disposed garments can be treated with enzymes so the material can be used again as raw, or even be degraded.*

## **Part III. Detergents ~25 seconds**

*Note: For **detergent**, developing new and improved enzymes, such as lipases, which help to remove fatty stains at low wash temperatures (20-30°C) give the consumers new opportunities to reduce the carbon footprint and the energy needed for heating the water during laundry. However, it is very challenging to a) identify new enzyme candidates, which bring new and promising properties, and b) to evaluate if these wild type enzymes are applicable for our target.*

Zooming from the detergents image into the washing machine’s drum/tub: an enzyme “eating” grease dirt that easily gets out of the fabrics and disappears. Showing that the water temperature is low and that with enzymes, the amount of chemicals used in the final composition are reduced, delivering cleaner water to the environment.

*Text/voice: In laundry detergent formulation, the use of more efficient enzymes at low temperature and more stable enzymes at any storage conditions will improve laundry neatness while reducing energy and water consumption, and less chemicals in the formulation to be released to urban sewage.*

## **Part IV. Cosmetics ~25 seconds**

*Note: For **cosmetic**, enzymes (hyaluronidases) can have an effective role in hydrolyzing the long hyaluronic acid in a short-defined molecule that is key to the production of anti-ageing cosmetics. However, it is not so easy to find an enzyme that cuts this very long molecule into small pieces of a defined size with highest anti-ageing properties. The complexity of the products to be implemented together with the bottlenecks in selecting the best enzymes from all the millions available in nature are the biggest challenges.*

Zooming from the cosmetics image into the hyaluronic acid’s cream container: big hyaluronic acid polymer being cut by enzymes into smaller hyaluronic acid polymers (explaining by text or voice that other sizes are not so effective or can produce immune responses). Then zooming again from the cosmetics image into epithelial cells. A short hyaluronic acid molecule penetrating into the interstitial space (other bigger hyaluronic acid molecules try unsuccessfully) where it can be seen the beneficial effect of this active principle in the skin and how it unwrinkles the skin (hyaluronic acid retains water in a percentage of thousands-fold its

weight, helping to rebuild the fibres that sustain the skin tissues; hyaluronic acid occupies the space that leaves the lost collagen and stimulates its production).

*Text/voice: Hyaluronic acid is a commonly used compound in cosmetics due to its moisturizing properties. But its size is key: enzymes can cut big hyaluronic acid molecules to a precise size, replacing the commonly needed processes that uses high water amounts at elevated temperatures. When the hyaluronic acid molecules with the perfect size is applied on the skin, it has the highest penetration power in the dermis and avoids allergic reactions, while obtaining the best anti-aging results, moisturizing the skin and reducing wrinkles.*

#### **Part V. Final scene ~20 seconds**

Transformation by the use of our enzymes in industry and in everyday products. Factories throw clean fumes, rivers are clear, no trash everywhere, nature is “happy”.

*Text/voice: In FuturEnzyme, we aim at implement our awesome enzymes in these everyday products and carry them to the edge of biotechnology to be applied in industrial processes*

*Final image: FuturEnzyme’s tree image with the full project’s name, partners’ logos and map, and funding information.*

The video was released on 19<sup>th</sup> September 2022. It includes subtitles and voice (in English). It can be seen in [FuturEnzyme’s website](#), and posts were made in [X](#) and [LinkedIn](#). It is also available in FuturEnzyme’s community in [Zenodo](#).

#### 2.2. Comic

The chosen illustrator was Ainhoa Quirós. She already produced visual materials for us, such as the project’s logo and 5 images that we use in the brochures, website, and other materials (see Deliverable D8.2\_Visual identity guidelines).

The length of the comic is 13 strips long plus one with the project info and partners (see below, **Annex**). It is meant to be spread mostly by digital media, but we also printed it (examples in this [post](#)). It was designed in such a way that different parts can be used separately as in the case of the video. Some of the comic characters are inspired by the image of some of the members of the consortium (who agreed for their image to be used with this purpose). It was released on 9<sup>th</sup> October 2023. It is available in [FuturEnzyme’s website](#), and in FuturEnzyme’s community in [Zenodo](#). Posts were made in [X](#), and [LinkedIn](#).

The idea to transmit is resumed here. There are products on the market whose daily consumption contributes globally to worsening climate change and pollution. As example, the world average temperature has risen more than 1°C in only the last two decades! Some industries are continuously working to make their products more efficient and environmentally friendly. This requires collaboration between research centers, universities, industries and consumers, to continue pursuing a 100% sustainable model.

An essential innovation for this goal is the use of enzymes, proteins found in all living beings. They are eco-ingredients and we have learned to extract, improve and use them in multiple sectors and products that are key in circular economy. In fact, today, thousands of enzymes are available on the market, the global production of which reaches 117 kilotons per year.

But we need more enzymes, better than those available on the market, with which to develop products that meet increasingly stringent environmental and quality standards. We show how we can green the world through enzymes. The comic is shown below, and is structured in 3 blocks: Introduction, Research, and Application, plus another slide with partners’ logos and funding information.

### 3. Presentation Venues for the Video and Comic

In addition to the presentation and access to the comic and video on the FuturEnzyme's website and Zenodo, as well as posts made on X and LinkedIn, we have showcased our video and comic at various events to reach a broad audience and gather valuable feedback. These presentations have allowed us to engage with diverse groups, including professionals, students, and the general public, enhancing the impact and visibility of our project. Below are the events where our materials have been presented:

- ECOMONDO – Italian Exhibition Group, 07-10.11.2023, Rimini, Italy
- The 4<sup>th</sup> Year Secondary Education + Business Program, an educational initiative by the Community of Madrid aimed at students in their 4<sup>th</sup> year of Compulsory Secondary Education.
- CLIB International Conference, 22-23.02.2024, Düsseldorf, Germany
- Bioeconomy Changemakers Festival, 13 -14 March 2024 in Brussels
- Outreach event 'Europe Day at the Eugenio Trias Library', held on May, 8, 9 and 10, 2024, at the mentioned library, in Madrid, aimed at students in their Compulsory Middle and High Secondary Education.

### 4. Conclusion

We had a slight delay to accomplish this deliverable on time because finding a company for the video with a good quality/prize relation was complicated, we contacted in advance with the Project Officer via the Communication section of the EU portal to let her know, which was allowed. Such postponement will not have negative consequences on the project and will give us the possibility to make more audiovisual material throughout the project as we have found more economical and high-quality graphic options. In May 2024, the deliverable was reopened and the document updated.

This document is available in the website intranet of the project (see [www.futureenzyme.eu](http://www.futureenzyme.eu) -> login -> private-area -> DELIVERABLES & MILESTONES -> DELIVERABLES -> D8.12\_Short promo video or comic).



Introduction

**FUTUREZYME**  
technologies of the future for low-cost enzymes for environment-friendly products

Hello! I am Earthly!

I have some important stuff to tell you, join me!

The products we consume daily may affect our climate and environment, for example, raising the temperature of the planet by more than 1°C.

This is why industries are trying to make innovative and environmentally friendly products. But for their production to be 100% sustainable, innovative solutions are needed.

An essential innovation for this goal is the use of enzymes.

They are found in all living things as central element of their metabolism, but we have learned how to extract them.

And now, they are key for the circular economy, and in over 10% of the products we consume.

But we need more enzymes, better than those available on the market...

...with which to develop products that meet increasingly stringent environmental and quality standards.

Come with us and learn how we can green the world through enzymes.

Research

**Looking for new microorganisms**

Goche!

The best way to get enzymes is from the trillions of microorganisms living on our planet. So, we have work to do! First, we take samples from underexplored environments, including extreme sites, always being careful not to damage the place!

**The analysis of the metagenome**

From these samples, we can analyse the microorganisms they contain, but also their genetic material (DNA), the so-called metagenome.

**Computational analysis of the metagenome sequences**

The millions of genes in the metagenomes can be deciphered using sequencing services.

Moreover! Making use of novel super-computers and machine learning, we can select the genes encoding the new enzymes we are interested in.

In addition, improve them by predicting variations that are beneficial for the application in mind.

**Got the best enzyme!**

This is science, not magic, so sometimes we try and try... and in the end...

We disclose our hit!

To check it on the lab, we first produce it using our favourite expression microorganism, and then, test it for the target application.

**Pre-industrial enzymatic production**

Now is time to produce our hits in bigger amounts, for pre-industrial tests. We use fermenters of various capacities to produce our enzymes at gram scale.

Grams can seem like a small quantity, but in our body we have less than 1 kg of enzymes performing thousands of functions!

**Greening cosmetics with enzymes**

Cosmetic industry can use enzymes, for instance, in the production of very precise size anti-aging molecules, such as hyaluronic acid. With a green process we get a more effective product to make our skin glow.

**Greening laundry detergents with enzymes**

Check your laundry detergent bottle for sure you find enzymes in the ingredients list!

Enzymes added to laundry detergents allow the use of cold water for efficient cleaning using less chemicals.

**Greening textiles with enzymes**

Enzymes can also "eat" the garments since they are disposed so they can be recycled!

Textiles, we cannot live without them! Using enzymes in their manufacturing can diminish the amount of chemicals, water and energy for heating, while improving product quality.

Application, partners and funding

And, finally, you can enjoy your daily use cosmetics, detergents and textiles as always. Well, wait, not as always! With enzymes involved, we fight climate change and reduce the damage to nature.

FuturEnzyme Project funded by the European Union H2020 research and innovation programme under Grant Agreement number 101000327