LIFE Biorefformed

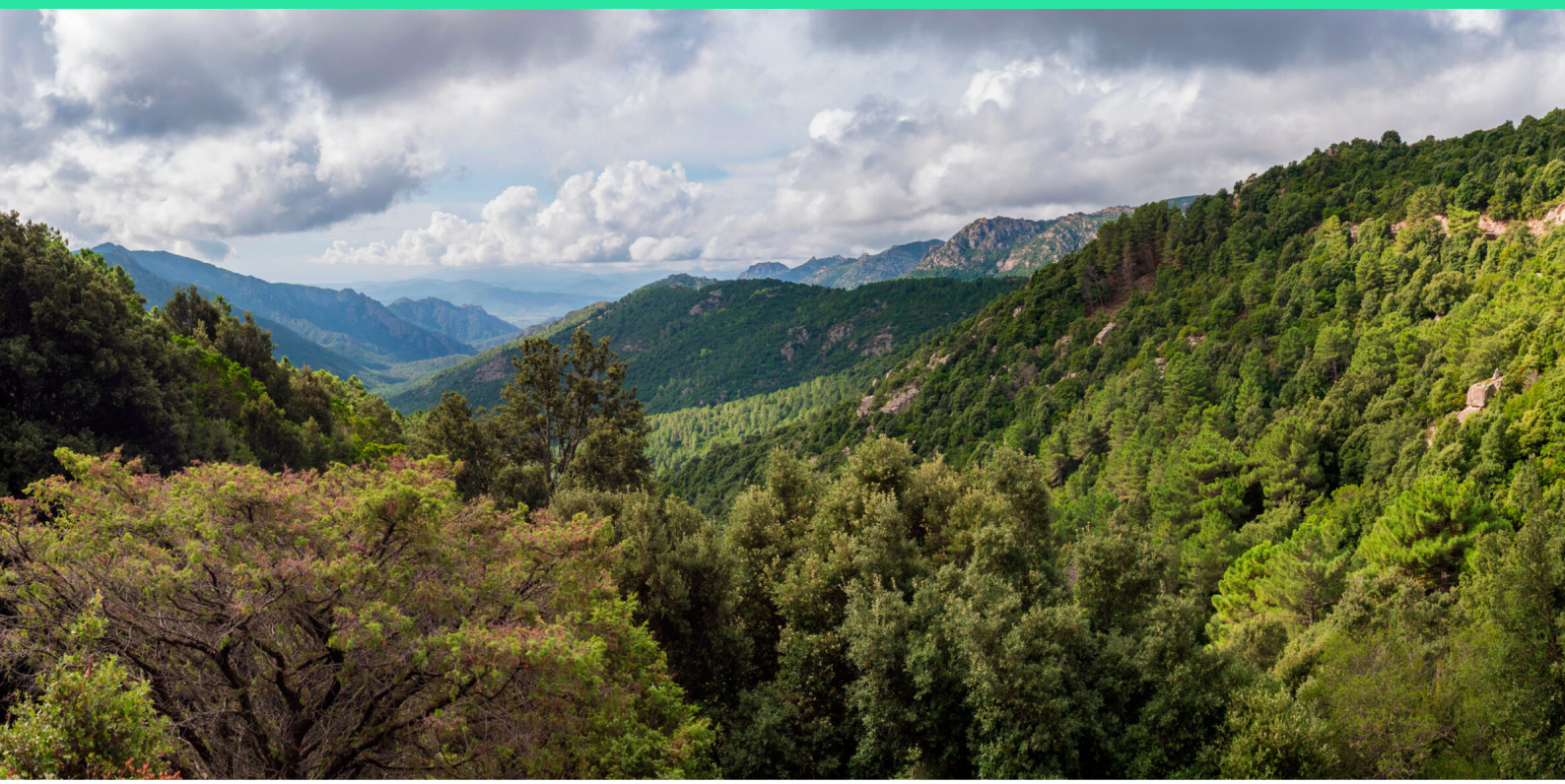
NEWSLETTER September 2024

We are happy to bring you a summary of what we have been doing recently!

Do not forget to stay tuned following our twitter account

After four years of dedicated effort, we have reached the final stage of our project. The time has come to bring it to completion. All loose ends have been addressed, and the outcomes of our actions have been effectively communicated.

We are proud to have successfully achieved our objectives, and we have a clear vision of what comes next: the After LIFE BIOREFFORMED. We are committed to improving and expanding some of the actions, as well as incorporating new ideas. Additionally, we held the final monitoring meeting and the final event with all those who participated in the project, which is explained in detail in this newsletter.



CTFC

Final event

The final event was held on 27 September at UAB University. Neus Puy from CTFC welcome the attendees and highlighted the expected objectives and impacts of the project, focusing on the production of bioproducts in conjunction with sustainable forestry management.

Teresa Cervera from CPF presented the forestry results, emphasizing the contribution of low-quality timber and noting that, unfortunately, costs and economic viability still need improvement, particularly regarding timber extraction and transportation costs. While bioproducts could help offset some of these costs, they cannot cover the forestry work itself. However, if a biorefinery is installed on-site, this could significantly improve the final costs.

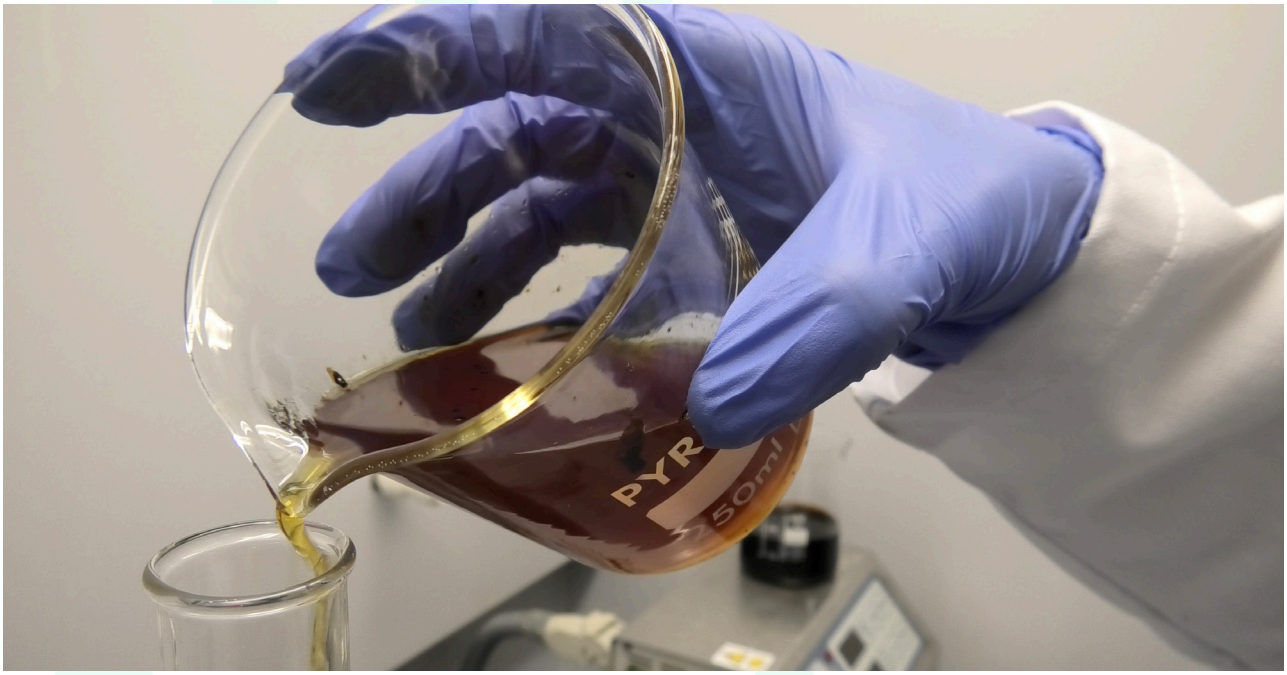
Esteve Fábregas from UAB presented the chemical analysis performed and the separation methodologies designed, highlighting the effectiveness of different biomasses. *Aleppo pine* was found to be the most relevant in the research for antioxidants, followed by chestnut and cork oak. Shrubs also supplied significant levels of carboxylic acids. All the results are summarized in Table 1, showing the yields and potential uses of the products obtained from the processing of biomass from the demonstration stands at a pyrolysis temperature of 400 ºC.

Image 1. Programme of the final event.

Image 2. Attendees at the final event during the presentation of the project results.

Table 1. Yields (g product/kg biomass) and potential use of the products obtained in the processing of biomass from the demonstration stands in the LIFE BIOREFFORMED biorefinery at a pyrolysis temperature of 400 ºC.

Fraction	Bioproducts	Biomass origin and yield of products obtained (g/kg biomass)							
		Pp	***Ph leaf***	***Ph***	***Qi***	***Au***	***Ea***	***Qs bark***	***Cs***
Liquid fraction (Bio-oil)	**Antioxidants** Phenol, catechol, vanillin, guaiacol, p-creosol, p-cresol	4.0	4.4	4.6	2.5	0.6	2.3	1.1	0.7
	Sugars Levoglucosan	6.9	8.3	9.5	5.9	2.9	9.6	2.7	5.9
	Acids Acetic acid, formic acid	16	21.1	17.6	19.8	11.9	25.6	17.6	11.5
	Aldehydes and ketones Hydroxyacetone, methyl cyclopentenolone, furfural, 5HMF	3.8	6.4	5.4	6.0	2.4	5.4	2.9	2.1
	Phenolic resins	3.33	2.38	1.43	2.01	1.67	2.01	1.34	2.33
Solid fraction (Biochar)	**Biostimulants** (g/100 mL) produced at 300 ºC	1.5	1.4	1.2	1.6	1.6	1.4	2.3	2.4
	Biochar (MJ/kg)	29.9	25.8	26.2	24.2	22.1	23.1	16.6	22.7



Pere Rovira from CTFC presented the analysis of biochar and commercial humic amendments. Currently, the most available source is leonhardite, but LIFE BIOREFFORMED offers more sustainable alternatives based on lignin.

Luis Ayxela from ENERGBAS presented the results of the biorefinery. He pointed out that the return on investment is difficult to recover due to the high costs associated with extracting biomass and bioproducts. They are working on small-scale biorefineries to be installed on-site, which would help to reduce transportation costs and lower the initial investment.

Jordi Vayreda from CREAF showed the forestry practices applied in different plots. Various sites were monitored under different conditions. The results were as follows: when both wood and tops (including branches and leaves) were harvested, phosphorus levels decreased in the first year but stabilized in the second. In contrast, when only wood was extracted, phosphorus levels decreased less.

Roser Maneja from CTFC presented the cultural ecosystem results of the project. The first study focused on understanding the general context of the property and the types of silvicultural processes applied over the years. Forestry practices and active land management led to a better cultural ecosystem, improving socio-ecological heritage, educational and research activities, recreational use, and the consolidation of intangible heritage.

The environmental impact of the project was presented by Xavier Gabarrell from UAB using Life Cycle Assessment (LCA) techniques. It was noted that electricity consumption and the chipping process were the most impactful activities, as well as gasoline consumption in forestry machinery. Image 2 shows the attendees at the final event during the presentation of the project results.

After the presentation of the LIFE BIOREFFORMED results, the **Bioeconomy Strategy of Catalonia 2023 and its Action Plan 2025–2027** were introduced by a member of the Department of Agriculture, Livestock, Fisheries and Food (DARP) of *Generalitat de Catalunya*. The document focuses on the profitability of the bioeconomy's own resources and aims to develop economic sustainability, as well as social and environmental factors, to ensure the optimal balance of these resources. This strategy is structured around several key objectives, and work is currently on the inventory of bio-products, resilient landscapes and pilot plots and, climate credits.

The event ended with an open debate, moderated by Teresa Cervera from CPF. It was structured into 4 blocks:

1) Forest management and biomass extraction.

2) Biorefinery - Process dimensions and costs.

3) Bioproducts - Market for new high-value products.

4) Impact - Environmental, economic, and sociocultural assessment.

Image 3. Attendees participating in the open debate.

After-LIFE

LIFE BIOREFFORMED has generated valuable results and materials; therefore, the project will continue its communication and knowledge transfer efforts to make LIFE BIOREFFORMED's products more visible. To this end, some of the main communication objectives for this period will be:

1. Increase awareness of the potential of biorefineries to produce renewable chemicals and fuels from forest biomass.

2. Encourage the implementation of biorefineries in the Mediterranean to boost the sustainable management of forests to fight against climate change and rural depopulation.

3. The effect on ecosystem services and forest health of medium-term forest treatments in relation to the adaptation of Mediterranean forests to climate change.

Spreading the knowledge of the LIFE BIORREFORMED project

Neus Puy, Head of the Bioeconomy, Health, and Governance Programme at CTFC and coordinator of LIFE BIOREFFORMED project, participated in the 3rd **BIT CONGRESS 2024**, the leading bioeconomy, innovation, and technology congress in Catalonia (https://www.congresbit.cat/en/). It is a place to learn about trends, innovations, and business projects related to bioeconomy. The thematic session she participated in was titled "**Bioeconomy and the Transition Towards Bio-based Chemicals**." (see Image 4. Programme of BIT congress).

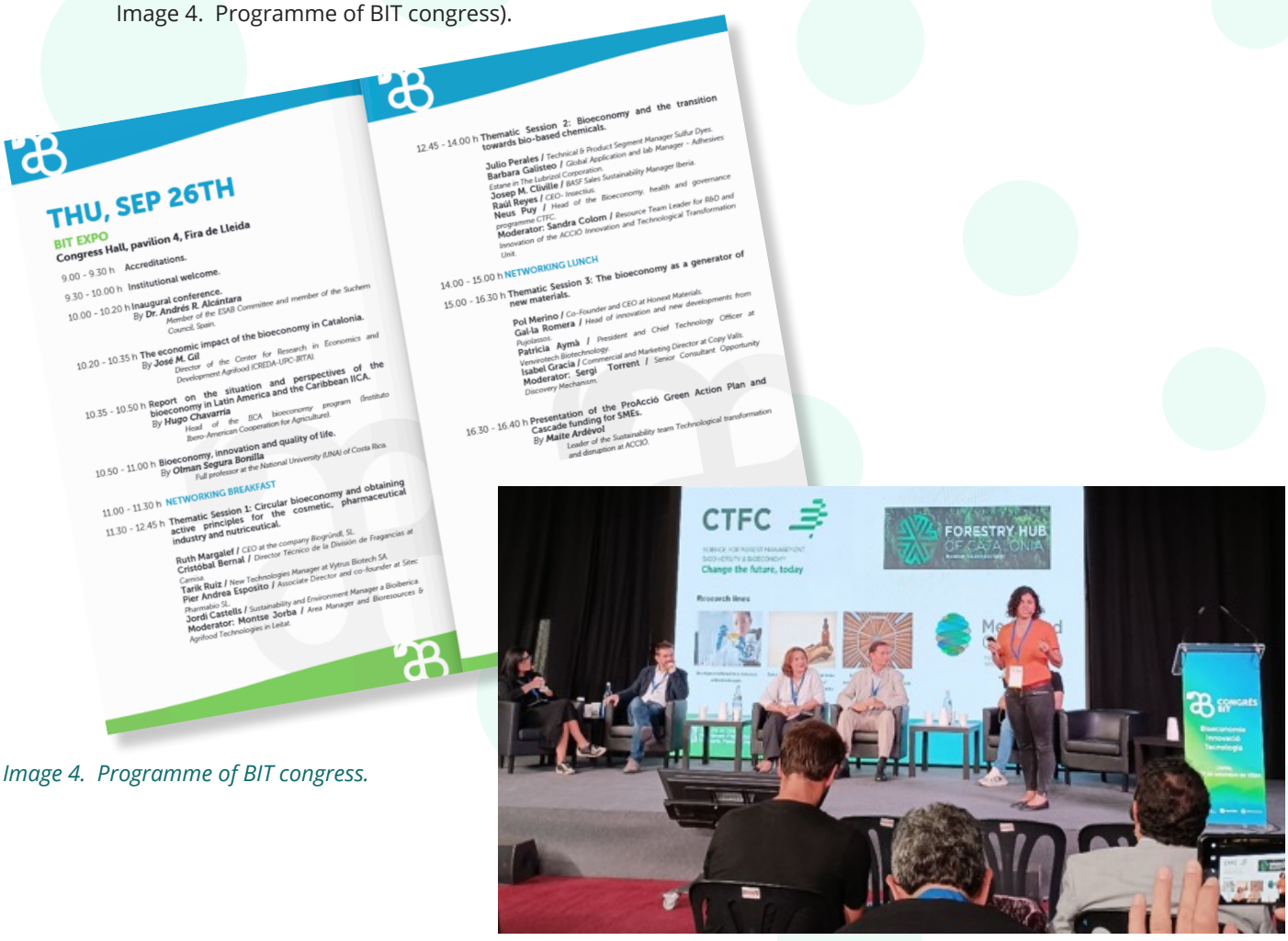


Image 4. Programme of BIT congress.

Thank you all for your support during the project and for following us! We will keep working on promoting the biomass and biorefineries!

Do not forget to stay tuned following our twitter account
You can contact us at info@lifebiorefformed.eu

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