



# Hemp Club



Co-funded by the COSME  
programme of the European  
Union

**Total budget:** EUR 587 972.48 |  
**Total funding:** EUR 462 976.00

April, 13<sup>th</sup> 2022

Presenting hemp-based  
success cases as funded  
projects

# Overview

## Hemp cultivation contributes to the European Green Deal objectives

- **GRACE:** GRowing Advanced industrial Crops on marginal lands for bioRefineries
- **SSUCHY:** Sustainable structural and multifunctional biocomposites from hybrid natural fibres and bio-based polymers
- **MULTIHEMP:** Multipurpose hemp for industrial bioproducts and biomass
- **CATERPILLAR:** Textile hemp for the production of functional food and protein biomass for animal feed



# The GRACE project

## Project overview

- **G**rowing **A**dvanced industrial **C**rops on marginal lands for **biorE**fineries
- **B**BI **J**U **P**roject - Innovation Action
- Project duration: **54 months** (June 2017 – December 2022)
- Consortium:
  - 21 partners from 10 European countries
  - 6 academic institutions
  - 12 SMEs and big industries
  - 3 clusters and associations



**GRACE**

[www.grace-bbi.eu](http://www.grace-bbi.eu)



# The GRACE project

The GRACE project demonstrates **large-scale miscanthus and hemp production** on land with low productivity, contaminated soil or which has been abandoned (**marginal land**). The aim is to secure the supply of sustainable-produced raw materials for the growing European Bioeconomy. In the project, **ten different demonstration cases** are used to show how biomass cultivation can be linked to the near-industrial-scale production of various biobased products



Miscanthus



Hemp



# The GRACE project

## Natural fiber reinforced bio-based composites

Biobased composites with high renewable levels will be developed combining hemp natural fibers with bio-based plastic material



## Mycellium based panels

The mycellium fungi is allowed to grow on the biomass until it is completely covered with mycel biomass. At this stage the panels are dried, pressed and thereby sterilized. In this process the mycel is acting as a natural binder and no chemical additives are required.



## Non-psycotropic cannabinois

CBD is produced by the plant thricomes but can be also found in the threshing residues, side stream of the hemp cultivation for seeds production. It can be used in the pharma and cosmetic markets



## Pelargonic acid

Obtained from hemp oil, pelargonic acid is a biological herbicide with an improved environmental profile and avoidance of any safety risks compared to standard herbicides



# The SSUCHY project

## Project overview

- **Sustainable structural and multifunctional biocomposites from hybrid natural fibres and bio-based polymers**
- **BBI JU Project** - Research & Innovation Action – **Value Chain 1: Lignocellulose**
- Project duration: **54 months** (September 2017 – February 2022)
- Consortium:
  - 17 partners from 10 European countries
  - 10 academic institutions
  - 6 SMEs and big industries
  - 1 competitiveness cluster



[www.ssuchy.com](http://www.ssuchy.com)



# The SSUCHY project

SSUCHY partners worked towards the development of multifunctional recyclable and/or biodegradable **bio-based composites** with advanced functionalities for applications in transportation (ground transportation and aerospace) and high value market niches such as the **acoustic and transportation sectors**, based on lignocellulosic renewable feedstock (**hemp and wood**)

The SSUCHY project had **five core objectives**:

- Multifunctional bio-based composites
- **Hemp-based competitive reinforcement**
- Hybrid fibre reinforced composites
- Bio-based functionalized and optimized polymers for PFCs
- Tailored ligning derived monomers for high-grade polymer



## Hemp value chain

The objective was to produce plant-based reinforcements at **competitive prices** for composite applications by proposing and optimizing suitable primary (from stems to rovings) and secondary (fabric manufacturing) processing routes that **cause less damage to fibers**.



# The SSUCHY project

## Aerospace

- Cockpit panel for electric aircraft containing a 100% SSUCHY hemp woven reinforcement



- The panel is made of a sandwich composite composed of an epoxy flax composite combined with aerospace-graded foam with a total bio-based content of 40% in weight.
- Performances compatible with EUASA (European Union Aviation Safety Agency) regulations

Up to 85% reduction on GWP compared to the benchmark product (Epoxy-Glass Fiber)

## Transportation

- Monocoque structure for electric scooter with 100% SSUCHY hemp woven reinforcement
- Lighter structure and reduced labour time
- The expected manufacturing cost were drastically reduced compared to the current process



Up to 11% reduction on GWP compared to the benchmark (steel scooter frame)



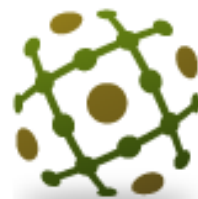


# The MULTIHEMP project

## Project overview

- **Multipurpose hemp for industrial bioproducts and biomass**
- **7<sup>th</sup> Framework Programme** project – Specific Programme “Cooperation”: Food, Agriculture and Biotechnology
- Project duration: **54 months** (September 2012 – February 2017)
- Consortium:
  - 22 partners from different European countries
  - 9 research institutions
  - 13 SME and big industries

<http://multihemp.eu/>



# MultiHemp



# The MULTIHEMP project

The MULTIHEMP project developed **hemp genotypes with enhanced traits** suitable for diverse cultivation environments and to provide improved feedstock for a wide array of innovative end products generated within an integrated biorefinery. The ambition was to develop an integrated hemp-based biorefinery in which improved feedstock is subject to efficient and modular processing steps to provide fibre, oil, construction materials, fine chemicals and biofuels using all components of the harvested biomass, and generating new opportunities within the developing knowledge based bioeconomy.

Every part of the hemp biomass can be exploited for added-value applications



Hemp-based products researched within the MULTIHEMP project:

- Oil for cosmetics and health care from **seeds**
- Insulation material and moulding (automotive) from **fibers**
- **Shives** to be used in the construction sectors



# The CATERPILLAR project

## Project overview

- **Textile hemp for the production of functional food and protein biomass for animal feed**
- **Rural development 2014-2020** for operational groups (art 56 of Reg. 1305/2013) in Emilia Romagna region
- Project duration: **24 months** (2020-2022)
- 14 partners coordinated by:
  - Openfield (SME in the agrifood sector)
  - CREA (research center as the scientific coordinator)



<https://www.gocaterpillar.it/>



# The CATERPILLAR project

The project aims to diversify production and increase the profitability of the hemp crop, generating new by-products with high added value related to food uses of the products and waste from fiber hemp processing, thus opening up market opportunities for farmers.

The seeds will be used for the production of oil and flour to obtain functional food (including gluten-free), and the stems will be used for the production of fiber and hemp. Fiber will be extracted from the stems in a prototype bioreactor for microbiological maceration; larvae of the *Hermetia illucens* will clean up the macerated fiber. Finally, the resulting larval biomass will be used for the production of additives for the feed

