



Biostimulant
alternative casing
for a sustainable
and profitable
mushroom industry

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Off The Peat Path Online Workshop
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BIOSCHAMP PROJECT

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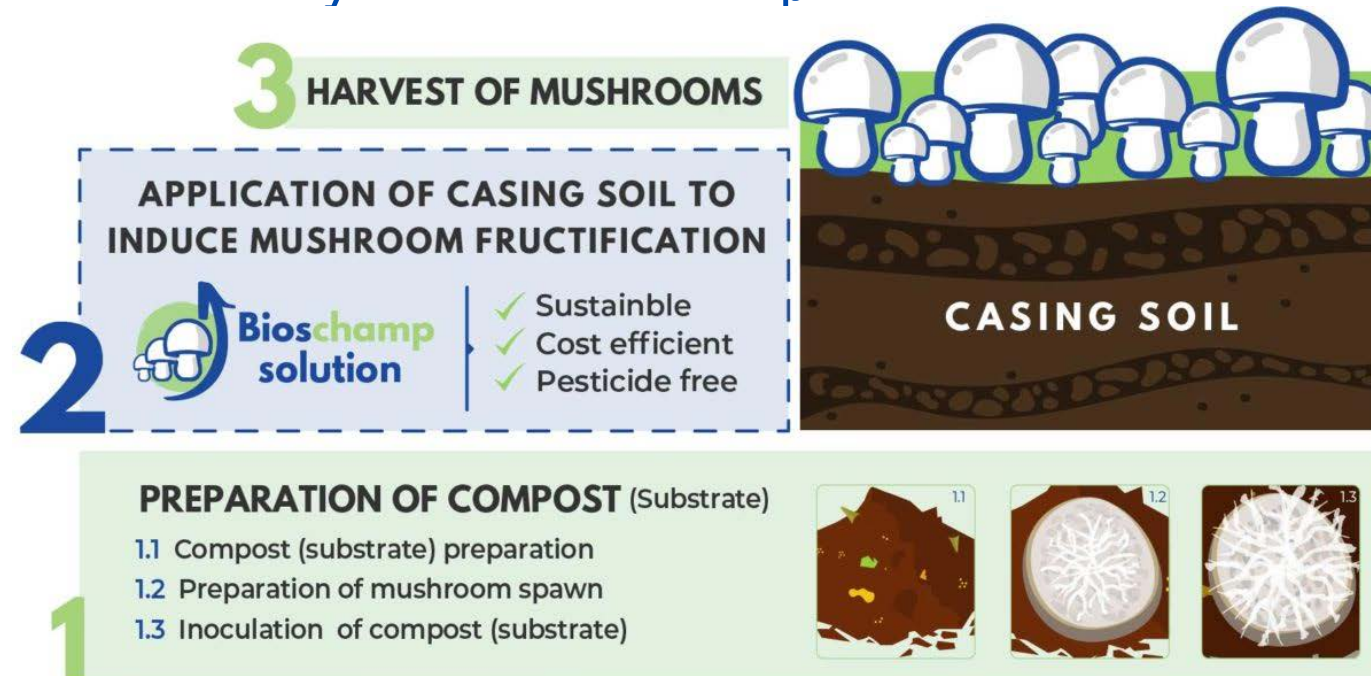
BIOSCHAMP Project

The BIOSCHAMP project aims to develop an integrated approach to tackle the mushroom cultivation challenges: an alternative and sustainable peat-free biostimulant casing for the mushroom industry, reducing the need for pesticides and contributing to improving the productivity, sustainability, and the profitability of the European mushroom sector.



BIOSCHAMP Objectives

1. Developing an alternative and sustainable low-peat biostimulant casing for the mushroom industry
2. Reducing the dependancy on and need for pesticides by 90%
3. Contribute to improving the productivity, sustainability and the profitability of the European mushroom sector



Consortium partners

- 5 Research Technological
 - ASOCHAMP-CTICH (Coordinator, ES)
 - Inagro vzw (BE)
 - Stichting Wageningen Research (NL),
 - IRNASA-CSIC (ES)
 - University of Oxford (UK)



- 3 large companies:
 - Kekkilä-BVB (NL), NF Fibre B.V. (NL)
 - Fertinagro Biotech (ES)
 - EUROCHAMP (ES)

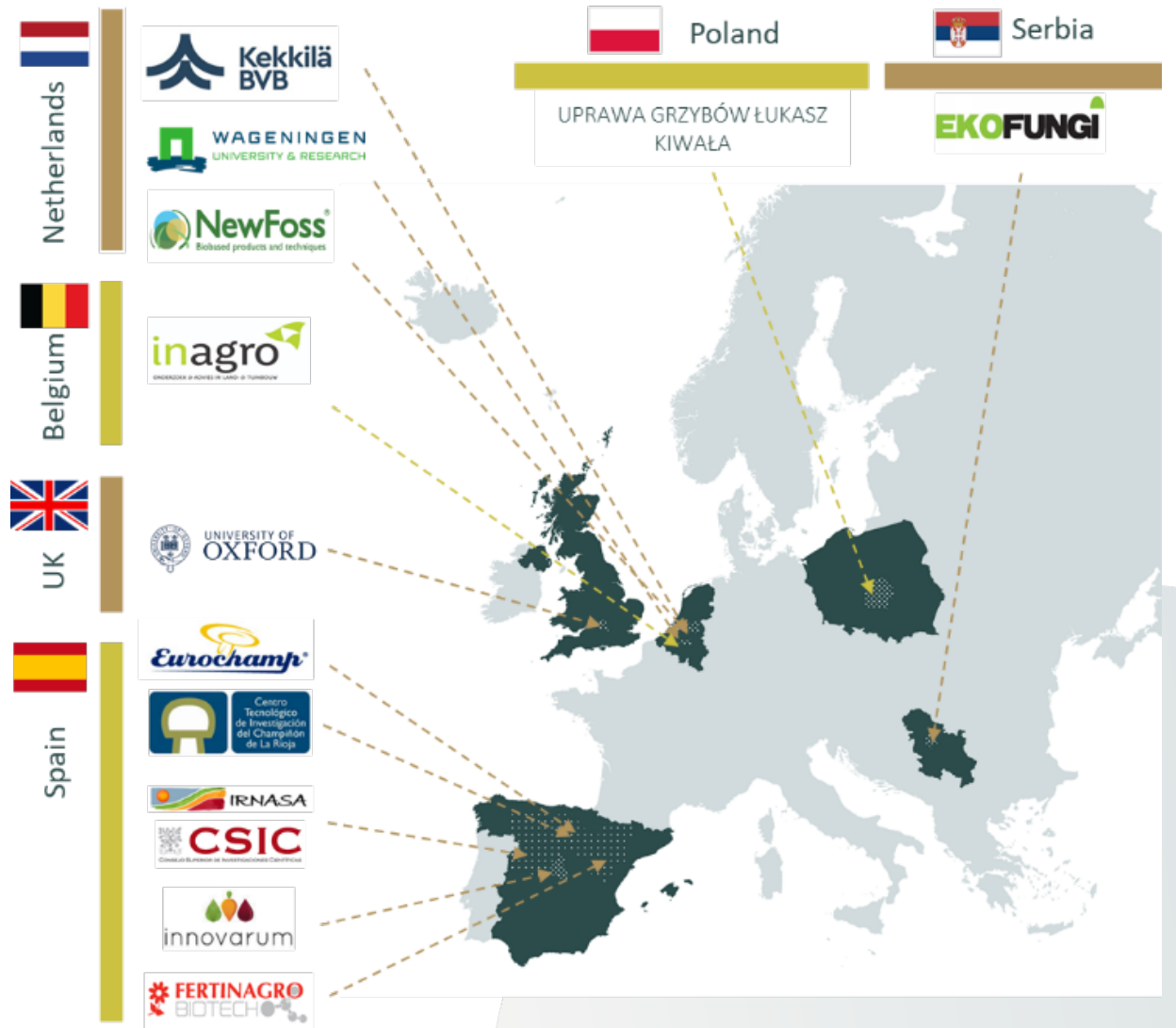


- 4 SMEs
 - Ekofungi (RS)
 - Innovarum (ES)
 - NF Fibre B.V. (NL)
 - Uprawa Grzybów Łukasz Kiwała (PL)



Uprawa Grzybów
Łukasz Kiwała

The geographic distribution of BIOSCHAMP partners



The Project Coordinator

Mushroom Technological Research Center of La Rioja (CTICH)



Centro
Tecnológico
de Investigación
del Champiñón
de La Rioja

Centro Tecnológico de Investigación del Champiñón de La Rioja

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Mushroom Technological Research Center of La Rioja (CTICH) was founded in 2003 and based in Spain, which aims assisting compost yards and mushroom growers to become more competitive.

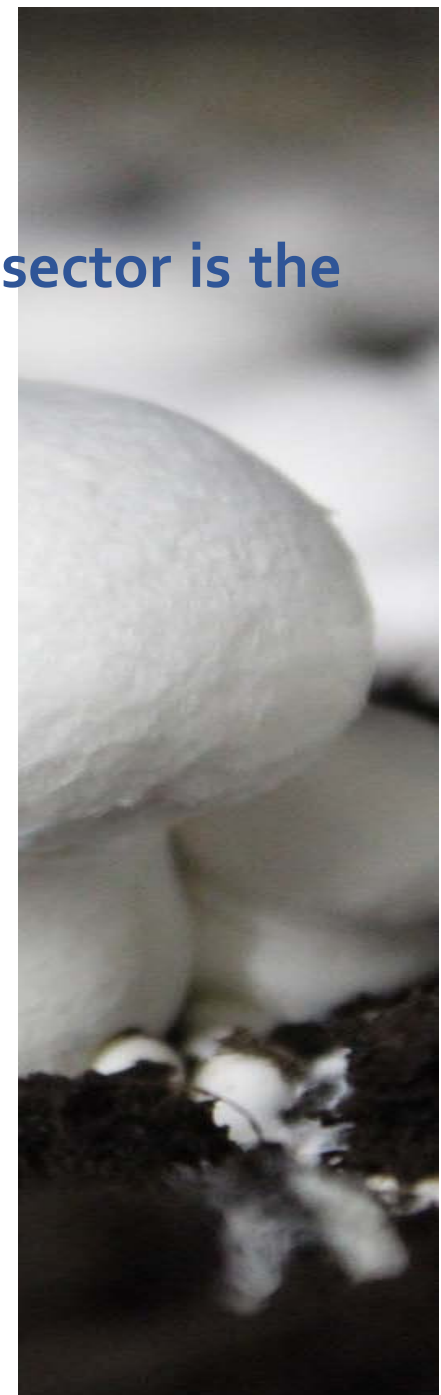


CTICH promotes the interrelation and collaboration between the different stakeholders in the sector, making easy the transferring of knowledge, experience and research results.

The development of research and innovation projects focusing on the sector is the main basis of the CTICH activities.

ACTIVITY AREAS:

- ◆ Mushrooms cultivation technology
- ◆ Biotechnology and applied genetics
- ◆ Health, nutrition and food engineering
- ◆ Environment protection and sustainable development



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Substrate design and production



- ✓ Raw materials trials
- ✓ Formulation design
- ✓ New analytical methods by NIR
- ✓ Yield improvement

Mushroom cultivation



- ✓ Mycelium strains conservation (culture collection)
- ✓ Pest and diseases control
- ✓ Crop management improvement
- ✓ Post harvest quality control



Substrate design and production

- Research chambers to produce **pasteurized mushroom substrate**.
- Pilot plant to produce **sterilize mushroom substrate**:
 - 1500L mixer
 - 5000L autoclave
 - clean room for mycelium inoculation
 - incubation rooms





Mushroom cultivation

- **Mycelium lab:** equipped laboratory to replicate and produce mushroom mycelium and mushroom spawn.
- **Climate controlled rooms**
 - Growing cabinet
 - Two commercial size cultivation rooms (180m²), dutch cultivation system.
 - Three medium size cultivation rooms (35m²).
 - Six small size cultivation rooms (18m²).





24 different species have been grown at CTICH

Agaricus bisporus (white)

Agaricus bisporus (portobello)

Agaricus subrufescens

Agrocybe aegerita

Auricularia auricular judae

Auricularia polytricha

Calocybe indica

Flammulina velutipes

Ganoderma lucidum

Ganoderma applanatum

Grifola frondosa

Hericium erinaceus



Hericium coraloides

Hypsizygus tessulatus

Lentinula edodes

Lepista nuda

Pholiota nameko

Pleurotus citrinopileatus

Pleurotus eryngii

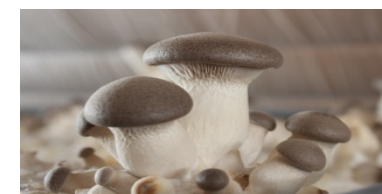
Pleurotus ostreatus

Pleurotus pulmonarius

Pleurotus salmoneo stramineus

Schinophylum commune

Trametes versicolor



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Biotechnology and applied genetics.



- ✓ Culture tests in liquid and solid media
- ✓ DNA extraction
- ✓ q-PCR analysis
- ✓ Metagenomic analysis
- ✓ Bioinformatics and biostatistics analysis



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Health and Nutrition



- ✓ Mushroom's functional food
- ✓ Bioactive compounds extraction
- ✓ Design and development of various alternative food preservation methods

Food engineering



- ✓ Fungus-based protein
- ✓ Liquid fermentation
- ✓ New and alternative sources of protein



Biocompounds extraction

- ✓ Pressurized Solvent Extraction (PLE)
- ✓ Ultra performance flash and preparative purification systems
- ✓ Parallel evaporation instruments



- ✓ Nutrient's study of fungal species
- ✓ Evaluation of mushroom's beneficial health properties (anticancer, antioxidant, anti-inflammatory)

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Environment Protection and Sustainable development



- ✓ Assessment of the compost used from the mushroom growing
- ✓ Finding solutions to the management and treatment of Spent Mushroom Substrate (SMS).
- ✓ Reuse and Recycling
- ✓ Side-streams and Waste Valorization
- ✓ Reduction of CO₂ emissions related to mushroom sector

BIOSCHAMP work plan

BIOSCHAMP Work Plan

WP1 - Developing alternatives to peat-based casing material

evaluation of alternative casing materials to peat-based casing, involving laboratory assays and small-scale trials.

WP2- Advanced Microbiota Optimisation

optimisation of the advanced microbiota, including the assessment of its stability and dose.

WP3- Design of a biostimulant casing

working on the design of the complete and integrated BIOSCHAMP solution, optimisation at a semi-commercial scale.

WP4 - Validation

conduction of commercial-scale trials in three button mushroom cultivation systems in Spain, Poland, the Netherlands and Serbia.

WP5 - Steps for industrialisation

industrialisation of the BIOSCHAMP solution, concerning establishing production at an industrial scale and obtainment of a stable commercial product complying with industrial needs.

WP6 - Security and sustainability

assessment of the developed solution's sustainability (LCA+S-LCA) and security, ensuring compliance with regulatory requirements.

WP7 - Communication, Dissemination and Exploitation

exploitation and dissemination of project results as well as communication activities.

WP8 - Project management

project management: administrative, financial, contractual and legal management as well as risk management.

WP9 - Ethics requirements

compliance of the project with the 'ethics requirements'

BIOSCHAMP implementation

BIOSCHAMP Implementation

Requirements for the alternative casing materials

A long-term regional availability

Stability and consistency of quality

Circularity and sustainability of their supply chain

Cost-effectiveness

Absence of any contaminants (heavy metals/pesticides)

Low disease pressure

Ease of disposal ...

... and most importantly, comparable productivity to peat.

BIOSCHAMP Implementation

Advances done so far in the project

Testing of 5 alternative casing materials in mushroom cultivation.

Analysis of mushroom yield and disease incidence.

Economic study of the alternatives.

Evaluation on its availability and replicability to European countries.

BIOSCHAMP Implementation

Results achieved

If we look for a substitution of 75% in peat, the yield loss goes up to 15%.

Several of the alternative materials need to be pasteurized or sterilized to avoid a higher disease pressure in comparison to peat.

Selection of two materials according to its availability and agronomic behavior to continue the trials.

Selected materials substitute 50% of peat without a significant decrease on yield and no differences in disease pressure

BIOSCHAMP

next steps

BIOSCHAMP next steps

Optimise the biostimulant dosage for each alternative casing

Select the best casing formulation

Validate the solutions at commercial scale

Thank you
for your
attention

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www.bioschamp.eu

