



With the contribution to the LIFE Programme
LIFE15 ENV/IT/000396



LIFE BIOREST Newsletter

ISSUE 1 – MAY 2017

LIFE BIOREST is funded by the European Commission in the framework of the
LIFE Programme “Environment and Resource Efficiency”



LIFE BIOREST project arise thanks to the collaboration among [Consorzio Italbiotec](#), [Actygea Srl](#), [ARPAE – Emilia Romagna](#), [University of Turin](#), [Catholic University](#), [Consejo Superior de Investigaciones Cientificas](#) and [SATT Grand-Est – Welience Agro-Environment](#). The aim of the project is to demonstrate the efficacy of a **biological remediation approach** for the decontamination of soils polluted by chemicals such as hydrocarbons and BTEX, together with other petrochemical materials, which represent 45% of the total pollutants reported in Europe. Experimental activities will take place in the nationally relevant site "ex-Carbochimica" of Fidenza (Emilia Romagna, Italy) and will be supported by the Municipality of Fidenza by providing infrastructures and areas already in force for other remediation activities. The environmental friendly, integrated approach proposed by LIFE BIOREST project is aimed to demonstrate the efficacy of a biological treatment of contaminated soils based on autochthonous bacteria and fungi. The goal is to develop a standard protocol that could be applicable also at regional, national and European level.

Actions. The project started on 1st July 2016 and is divided in 3 main “technical implementation” Actions:

Optimized soil bioremediation by selection microbial strains with high pollutant degradation capacity. The first phase of the project is aimed at selecting a library of bacteria and fungi (strains) “with high pollutant” degradation capacity by a screening process. Individual strains or selected microbial consortia are produced in the volumes required for experimental tests (microcosms and mesocosms) to select the most effective strains/consortia in reducing the concentration of target pollutants and ecotoxicity.

Scale up industrial production of microorganisms. The second phase of the project is aimed at the creation of microorganisms’ production protocols on industrial scale (bioaugmentation) for the remediation of ca. 400 m³ of soil. To make the entire process economically sustainable and effective, it will include the culture conditions optimization and a production costs analysis.

In situ bioremediation and revegetation. The second phase of the project is aimed at the treatment of the target site by “biopiles”. The soil treatment envisages the application of bioaugmented microorganisms (consortia of selected bacteria and fungal strains), and then the soil revegetation, by selecting ecologically adapted plant species. Overall, the environment/soil will its original ecological functions.



LIFE AND SOIL PROTECTION

Integrated approach to soil - a strength of LIFE

The LIFE programme has funded many projects dealing with soil issues - from limiting and mitigating land take to remediating contaminated soil, and pioneering innovative monitoring methodologies providing stakeholders with vital decision-support tools.

Though soil has not been a core theme of the LIFE programme, many soil-related projects have been funded over the last 21 years, and in line with the policy context, there has been an increasing focus on this topic since 2006.

- ◆ LIFE and soil sealing
- ◆ Soil biodiversity and carbon capture
- ◆ Monitoring
- ◆ Point and diffuse sources of contamination.

LIFE has been particularly supportive of projects addressing soil contamination issues. Point source contamination from industry, mining and landfills has been tackled through a range of innovative remediation techniques targeting various different chemical compounds. LIFE co-funding has helped develop environmentally friendly technologies such as In-Situ Chemical Oxidation and to remediate PCBs, lignite, asbestos, heavy metals and hydrocarbons, amongst other contaminants.

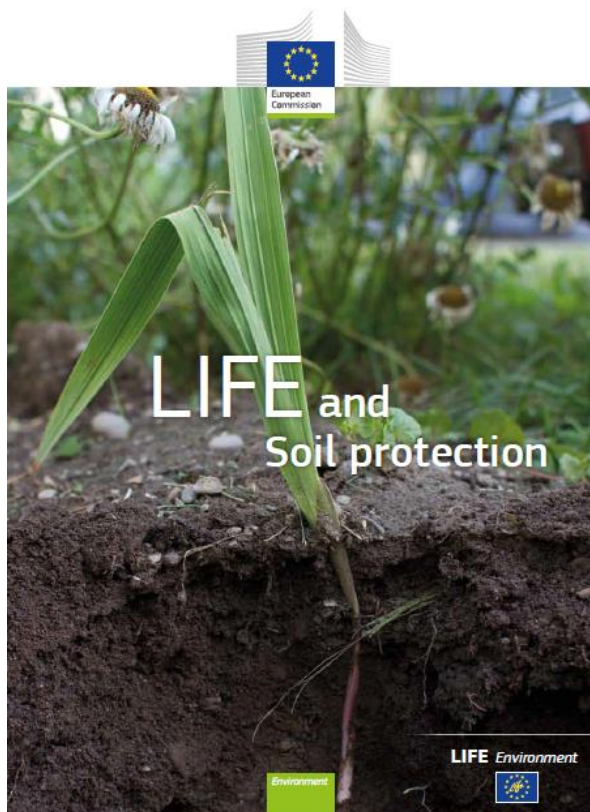
LIFE PROGRAMME

The LIFE programme is the EU's funding instrument for the environment and climate action. The general objective of LIFE is to contribute to the implementation, updating and development of EU environmental and climate policy and legislation by co-financing projects with European added value.



"Soil is linked to everything around us. However, we still are not aware of its importance for life and the economy. Soils provide vital ecosystem functions, playing an important role in food production, the water cycle and the provision of renewable materials, such as timber. Their carbon storage capacity is essential to the fight against climate change and soil biodiversity is vital to soil fertility and wider biodiversity."

*Pia Bucella - Director of Natural Capital
DG Environment
European Commission*





LIFE BIOREST Latest News



LIFE BIOREST partner of Biotech & Bioeconomy event

Network, Innovation and Enterprise, keywords of the seminar organized on March 28th 2017 by the Lombardy Green Chemistry Association, dedicated to the Call for the "Integrated Research on industrial biotechnology and bioeconomy" promoted by Fondazione Cariplo and Innovhub SSI, the special company of Chamber of Commerce of Milan.



LIFE BIOREST meets schools

Soil protection, Green Jobs & Green Talent, LIFE BIOREST team inaugurates the environmental education path for schools. The first meeting held on March 16th at the Catholic University - Piacenza campus and opened more than 70 students from the High School "Lorenzo Respighi" and the Agricultural Technical Institute "Raineri - Marcora" in Piacenza.



LIFE BIOREST at the "Fuori Sacco" TV show

Telelibertà Piacenza broadcaster, dedicated to LIFE BIOREST the cover of "Fuori Sacco" show, considered a point of reference for initiatives related to exploitation of local resources. The interview explains the objectives and the results expected from the project, able to develop a Bioremediation Model exportable at national and European level.

LIFE BIOREST A GLANCE

[Notice board and communication materials](#)



[Watch the LIFE BIOREST videos](#)



Visit our portal
www.lifebiorest.com

Follow us on Twitter!
twitter.com/Italbiotec

Visit our YouTube channel!
<https://goo.gl/Dtmjbl>



**First mid-term LIFE BIOREST meeting.
Turin, 3 March 2017**

Took place on March 3th at the Department of Life Sciences and Systems Biology of the [University of Turin](#), the first mid-term meeting of the LIFE BIOREST team.

All partners shared the results of the activities carried out in the first 10 months of the project. The research group of the University of Turin played a significant role, being responsible for the first phase of the project about the optimization of soil bioremediation by selection microbial strains with high pollutant degradation capacity. More than 300 fungi belonging to 75 species have been identified, as well as more than 140 bacteria isolated by [Catholic University](#) and [SATT Grand-Est – Welience](#)



Public awareness



LIFE BIOREST, What is soil protection for you?

Dialogue with citizens is a central aspect of LIFE BIOREST. The success of the transfer of the bioremediation method to other polluted sites will mostly depend on the ability to engage and raise public awareness. For this reason, LIFE BIOREST involves citizens, students, scientists in a continuous exchange of ideas and proposals. Contribute yourself, fill in our survey!

LIFE Publications

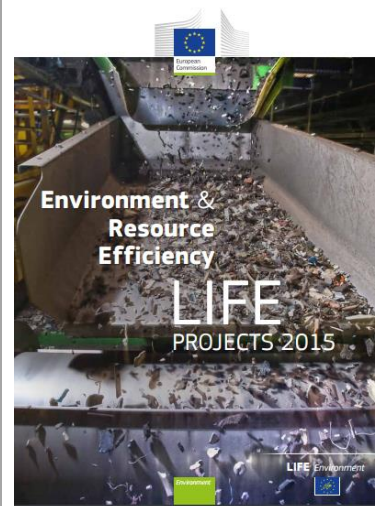
[LIFE Environment & Resource Efficiency 2015](#)

Commission funds 56 new projects in 10 countries with €71.9 million.

The European Commission has approved funding for 56 LIFE Environment & Resource Efficiency projects under the LIFE programme, the European Union's fund for the environment and climate action.

The projects involve a total investment of €142.2 million, of which the Commission is providing action grants worth €71.9 million. These projects cover actions in five thematic areas: air, environment and health, resource efficiency, waste and water.

[See LIFE BIOREST profile](#)





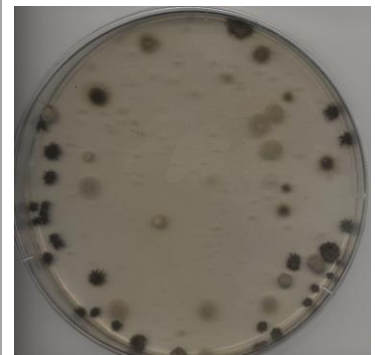
LIFE BIOREST Achievements – Action Leader FOCUS

The *Mycotheca Universitatis Taurinensis* (MUT) is hosted in the Department of Life Sciences and Systems Biology (DBIOS) of the University of Turin (Italy) and is currently one of the most important biobanks in Italy and Europe. The aim of MUT is the acquisition, identification, characterization, preservation and distribution of fungi to support basic research and biotechnology research and development.

Currently the MUT collection preserves about 6000 fungal isolates belonging to more than 1200 species encompassing almost all classes of fungi. The fungi have been isolated from very different habitats and substrates in arctic, temperate, tropical and subtropical zones and about one fourth of the strains have been isolated from marine environments. All the information about the database, the services and the research projects carried out at MUT are available on-line (www.mut.unito.it). Since 2006 MUT works according to ISO 9001 certification and since 2008 MUT is a member of the European Culture Collections' Organisation and the World Federation Culture Collections. In 2012 MUT joined the Microbial Resource Research Infrastructure Consortium (MIRRI – www.mirri.org), the EU Infrastructure designed to organize an unique portal to transnational and open access to: i) high quality microbial resources; ii) associated isolation, biological and chemical data; iii) microbial expertise and services facilitating the understanding of microorganisms and their full potential to tackle the societal challenges i.e. food security, sustainable agriculture, renewable energy and bio-economy. The MUT has a long expertise on the development of alternative solutions for a sustainable bioremediation of contaminated areas (soil, industrial wastewaters, superficial waters, etc.) focusing on fungi and their complex enzymatic pattern. Several fungi have been already characterized for their degradation potential and as strong producers of enzymes.

Within the project **LIFE BIOREST**, MUT is the leader of the **Action B1** entitled “**Optimized soil bioremediation by selection microbial strains with high pollutant degradation capacity**”. During this first phase of the project, MUT coordinates the effort of all the partners to characterize the autochthonous microbiota (bacteria and fungi) of the polluted site. First, the fungal and bacterial load of the contaminated area has been estimated, indicating a strong variability in the soil collected at different depth. Solid screening and enrichment liquid cultures were set up for the identification of microbial strains capable of growing in the presence of target contaminants as sole carbon source.

Isolated fungal strains



Fungal colonies grown on pyrene and phenanthrene (isolation plates)



Aspergillus terreus and Cladosporium cladosporioides isolated from the contaminated site



LIFE BIOREST Achievements – Action Leader FOCUS

Hundreds of fungi and bacteria have been isolated, identified, dereplicated and characterized with the aim to select a library of bacteria and fungi endowed with useful properties for bioremediation purposes, i.e. high degradative capabilities against different target pollutants, capability to produce biosurfactants and/or extracellular oxidative enzymes (laccases, peroxidases).

Overall, the 314 fungi and the 256 bacteria isolated were ascribable to 85 fungal taxa and to 46 bacterial taxa. The necessity to process a large number of microbes (quantitative data) prompted the consortium to set-up a new miniaturized screening using 96 multiwells plates based on the Phenotype MicroArray system of Biolog® inoculating the microbes in the presence of 6 target pollutants (benzene, naphthalene, phenanthrene, pyrene, paraffin oil, heptadecane) as sole carbon source. Moreover, screenings of fungi capable of producing redox enzymes were carried out using colorimetric tests with redox markers, while 4 tests were used to highlight the production of biosurfactants. As regard fungi, MUT screened 211 fungi selecting dozens of fungi for high pollutant degradation capabilities, biosurfactants and/or redox enzymes producers.

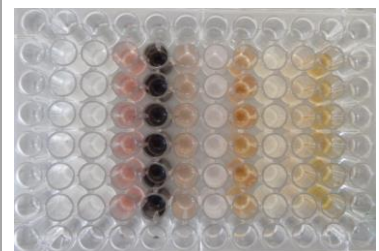
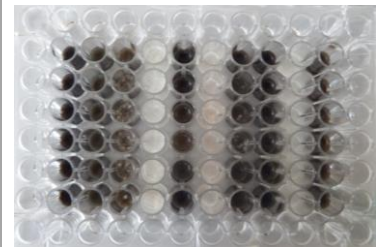
Several of them have been selected for the following steps of the project (microcosms and mesocosms trials), taking into consideration also their growing properties (robustness, high sporulation rate, growth in a wide range of conditions, etc.) that will be helpful for the massive inoculum production at industrial level.

Currently, microcosms and mesocosms are ongoing to select the most effective strains/consortia to reduce both the concentration of target pollutants and the ecotoxicity of the Carbochimica polluted soil.

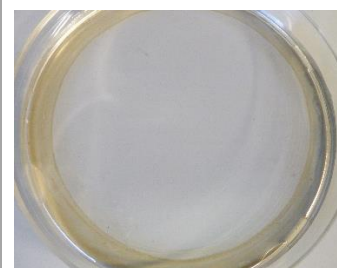


Trichoderma harzianum and *Trametes gibbosa* grown on rice husks for micro- and mesocosms tests

Fungi grew



Fungi grew in 96-wells plates using different pollutants as sole carbon source



*Biosurfactants production by *Aspergillus terreus* (dark halo in blue agar test) and *Bjerkandera adusta* crude extracts (drop collapsed test)*



Upcoming LIFE BIOREST events – SAVE THE DATE



Let's celebrate with us!
LIFE Open day - Milan, 26 May 2017

The EU has been supporting nature, environment and climate action for 25 years! To celebrate this milestone the LIFE community is organising a series of events around Europe during May 2017, a date that also marks a quarter century of the EU Habitats Directive and Natura 2000 network of protected areas. **LIFE BIOREST** promotes an **Open day** to celebrate the anniversary, sharing the LIFE Program success and supporting networking between LIFE and non-LIFE projects.



[PROGRAMME](#) | [Read more](#) | [Joint in a click!](#)

GREEN JOBS
for a greener future



Milan, 9 June 2017

EU Green Week is the annual opportunity to debate and discuss European environmental policy. Organised by the EC DG Environment, this key event in the environment policy calendar attracts policymakers, leading environmentalists, stakeholders and other interested parties from across Europe and the globe.

LIFE BIOREST takes part of this initiative by a partner event open to stakeholders, students, researchers and the general public.

Networking

Collaboration and good practices exchange, here is the network!



LIFE Programme OPEN DAY is organized in collaboration with:



Improved flux Prototypes for N₂O emission from Agriculture





Upcoming LIFE BIOREST events – SAVE THE DATE



LIFE BIOREST at BIOBIO 2017

Prague, 25-29 June 2017

Since 1995 this symposium has served as a platform for researchers interested in the remediation of contaminated environments to exchange knowledge, establish new contacts across disciplines, and foster international collaborations. Each three to five years, this meeting highlights the newest scientific advancements and cutting edge methodological approaches in bioremediation and biodegradation research. The programme committee strives to include trends in research that are at the forefront of the field and encourage participation of young scientists in the early stages of their careers.

University of Turin team led by Prof. Giovanna Cristina Varese, will illustrate objectives, strategy and results achieved far by LIFE BIOREST project, in particular the important research of high-capacity screening of fungal strains to degrade hydrocarbons and BTEX mixtures. The University of Turin team plays the fundamental role of coordination of the first phase of the project, focused on characterize the microbial community that naturally populate this extremely polluted site and isolate those microbes capable of growing in the presence of pollutants as sole carbon source. The best performing strains will be used to set up consortia working in microcosms and mesocosms before up-scaling the process at in-situ level (biopiles).

Together with the research team of the Catholic University and SATT Grand-Est – Welience Agro-Environment, a solid screening and a liquid enrichment using few selected contaminants (naphthalene, pyrene, phenanthrene, benzene, alkanes and oil extracted from the soil) were carried out to identify the strains with the best adaptation and degradation skills. **More than 300 fungi belonging to 75 species have been identified and more than 140 bacteria.** Almost 30 fungi and 30 bacteria have been selected and will be tested in microcosms singly and in consortia with selected bacteria in order to evaluate also their capability to grow and colonize the contaminated soil, and ultimately decontaminate it within 3 months treatment.

PARTNER FOCUS



The Mycotheca Universitatis Taurinensis (MUT) is the fungal collection of the Department of Life Sciences and Systems Biology of the University of Turin (Italy).

The MUT is one of the most important banks of fungal biodiversity in Europe, and it has a great value from the systematic, ecological and applications point of views. The aims of the MUT are the acquisition, identification, characterization, preservation and distribution of both macromycetes and micromycetes to support research and bio-based economy.

Since 2008, the MUT has been affiliated to the World Federation Culture Collections (WFCC), which represents a global network aimed to the ex-situ conservation of microbiological biodiversity. Since 2012, the MUT has been affiliated to EU infrastructure Microbial Resource Research Infrastructure (MIRRI).



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Upcoming EU events and initiatives – SAVE THE DATE



EFIB 2017

9-11 October 2017, Brussels, Belgium

EFIB, the European Forum for Industrial Biotechnology and the Bioeconomy, organized by EuropaBio and Smithers Rapra is renowned by a global audience as the annual EU meeting place for business and policy on Industrial Biotech and the biobased economy. This year's event is setup to surpass the success of the 2016 edition, which attracted 650 professionals from biobased industries to Glasgow for three jam-packed days of business essential presentations, enlightening workshops, a showcase theatre, PitchFest and one of the largest bioeconomy exhibitions in Europe.

5th Conference on Green Chemistry and Technology

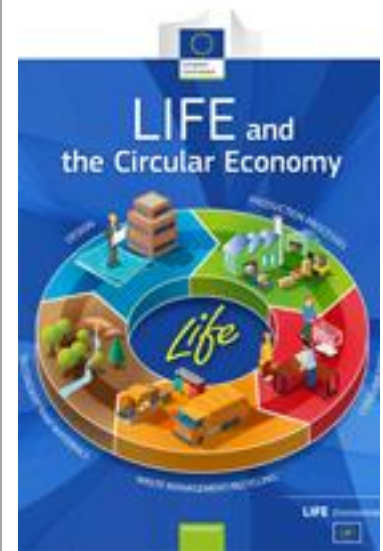
24-26 June 2017, Rome

Green Chemistry conferences aim to bring together the prominent researchers academic scientists, and research scholars to exchange and share their experiences on all aspects of Green Chemistry. It is also an interdisciplinary platform for researchers, practitioners and educators to present and discuss the most recent advances, trends, and concerns as well as practical challenges and solutions adopted in the fields of Green Chemistry.

NEWS from LIFE

New Focus on LIFE and the Circular economy

LIFE has published a new Focus brochure on one of the greatest environmental, social and economic challenges of the next 30 years – the transition to a circular economy.



25 years of EU supporting Nature,
Environment and Climate Action through **LIFE**