POSIDON

POLLUTED SITE DECONTAMINATION PCP

TESECO

Project Phase Abstract

POSIDON has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N.776838

Public Description of the Project

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Bidder Details	Type/ size of legal entity	Place of performance of contract activities	Logo
Main contractor TB TESECO BONIFICHE Via Stanislao Cannizzaro n.5, 56121 Pisa, Italy Marco Fanti ☎ +39366 6973379 ✉ mfanti@tesecobonifiche.it	SME	% of contract value allocated to main contractor: (65) % % of activities for the contract performed by the main contractor in EU Member States or countries associated with Horizon 2020: (55) %	
Consortium member 2 National Research Council (CNR) - Reserch Institute on Terrestrial Ecosystems (IRET) Via Guglielmo Marconi, 2 - 05010 Porano (TR) Grazia Masciandaro ☎+39 0503152481 ✉ grazia.masciandaro@cnr.it	Research Institute	% of contract value allocated to contractor 2: (7) % % of activities for the contract performed by the main contractor in EU Member States or countries associated with Horizon 2020: (7) %	
Consortium member 3 Agencia Estatal Consejo superior de Investigaciones Científicas (CSIC) Calle Serrano, 113, 28006 Madrid (Spain) Carlos Garcia ☎ +34 968396200 ✉ cgarizq@cebas.csic.es	Research Institute	% of contract value allocated to contractor 3: (7) % % of activities for the contract performed by the main contractor in EU Member States or countries associated with Horizon 2020: (7) %	

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Consortium member 4 DN 360 srl P.zza d'Ancona, 3 56127 Pisa, Italia Cosimo Masini ☎ +39 331 6162033 ✉ cmasini@dn360.it	SME	% of contract value allocated to contractor 4: [7] % % of activities for the contract performed by contractor 2 in EU Member States or countries associated with Horizon 2020: [7] %	
Consortium member 5 BioCastle Water Technologies Ltd. *TZemach* Industries, Jordan Valley, 151050, Israel Ofir Menashe ☎ +972542195000 ☎ +97246804666 ✉ info@bio-castle.com ✉ ofirmenashe@bio-castle.com	SME	% of contract value allocated to contractor 5: [7] % % of activities for the contract performed by contractor [x] in EU Member States or countries associated with Horizon 2020: [7] %	
Consortium member 6 Studio Podgornik Srl Address legal entity: Via San Nicolò, 2, 34121, Trieste Sara Alzetta ☎+39 3667566220 ✉ sara@studiopodgornik.com	SME	% of contract value allocated to contractor 6: [7] % % of activities for the contract performed by contractor [x] in EU Member States or countries associated with Horizon 2020: [7] %	
Subcontractor 1 BD BIODIGRESSIONI srl Lungarno Mediceo 40, 56121 Pisa, Italy Giovanna Siracusa ☎ +393208055186 ✉ info@biodigressioni.it	SME	% of contract value allocated to subcontractor 1: [0] % % of activities for the contract performed by subcontractor [1] in EU Member States or countries associated with Horizon 2020: [10] %	

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Project abstract

The solution proposed for the decontamination of soils and groundwater is called *Soil-Omic*.
Soil-Omic consists of biological formulations and integrated (biological and chemical-physical) processes, aimed at the decontamination of soils and groundwaters from organic and inorganic contamination (the main targets are TPH, PAHs, some heavy metals including lead, and metalloids such as arsenic).
Soil-Omic is based on the integration of metagenomics and environmental engineering where metagenomics defines and assess the process engineering for the decontamination of environmental matrices.
Metabarcoding provides reliable information regarding both diversity (*what microorganisms are there?*) and function (*what can the microorganisms do?*), providing insights into *in situ* microbiome and microbiota structures, dynamics and functioning.
The environmental microbiome is responsible for the decontamination of an environmental matrices both as the primary and final effector in a mutualistic interaction with the ecosystem.
Soil-Omic therefore exploits the in-depth knowledge of the ecology of the soil and its microbiome to promote or induce an effective action of depletion and transformation of contaminants by autochthonous (preferably) or allochthonous microorganisms. The *Soil-Omic* protocols use chemical-physical technologies to support biodegradation, in order to remove those inorganic contaminants that cannot be destroyed, but only transferred from one matrix to another or made less bioavailable.
Soil-Omic technology is able to be declined in both *in situ* and *ex situ* practices, aimed to decontamination of soil and groundwater.
In *in situ* treatment, *Soil Omic* use site specific solutions for mobilization and removal of organic/inorganic contamination , biostimulation of autoctonous microorganisms, inoculation of selected strains. The technologies used for biological treatment *in situ* are therefore input wells, monitoring wells, extraction wells, drainage trenches and chemically and biologically active hydraulic barriers.
The contact between microorganisms and the matrices to be treated must be efficiently engineered, since the effectiveness of the biological treatment depends on this. For this purpose *Soil Omic* uses some evolving technologies, such as biomass encapsulation, or Bio-flushing that favorite both biostimulation and microbial spread.
Soil-Omic can also be used ex situ. *Ex situ* bioremediation take place in original mobile soil treatment platforms, in which we can use *Soil-Omic* protocols for biological degradation processes and chemical-physical reactions of transformation.
Given the fundamental importance of the water matrix, both as a target for treatments and as a vehicle for bio-flushing active ingredients, an important segment of the processes that will be put into practice will concern water purification. Also in this case, it is essential to use both chemical-physical and biological techniques.
The application methods of *Soil-Omic* are therefore multiple and adaptable to the specificity of the site of interest.
One of the strengths of *Soil-Omic* technology is the fact that it can be declined according to alternative or integrated processes, depending on the site-specific conditions, and therefore it

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represents an extremely flexible solution and adaptable to different environmental conditions.
The design and engineering of *Soil-Omic* technology has two decisive consequences for industrial application:
1) times, reduced compared to traditional bioremediation techniques, compatible with the objectives of urban redevelopment projects.
2) given the possibility of using Soil-Omic *in situ* and even *ex situ* on site, the proposed technology knows no "principle" limits on its application in different environmental contexts and at different scales of application.
Soil-Omic is a *green technology*, with a significantly lower footprint than the chemical and physical technologies currently used for the treatment of organic and inorganic contaminants.

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